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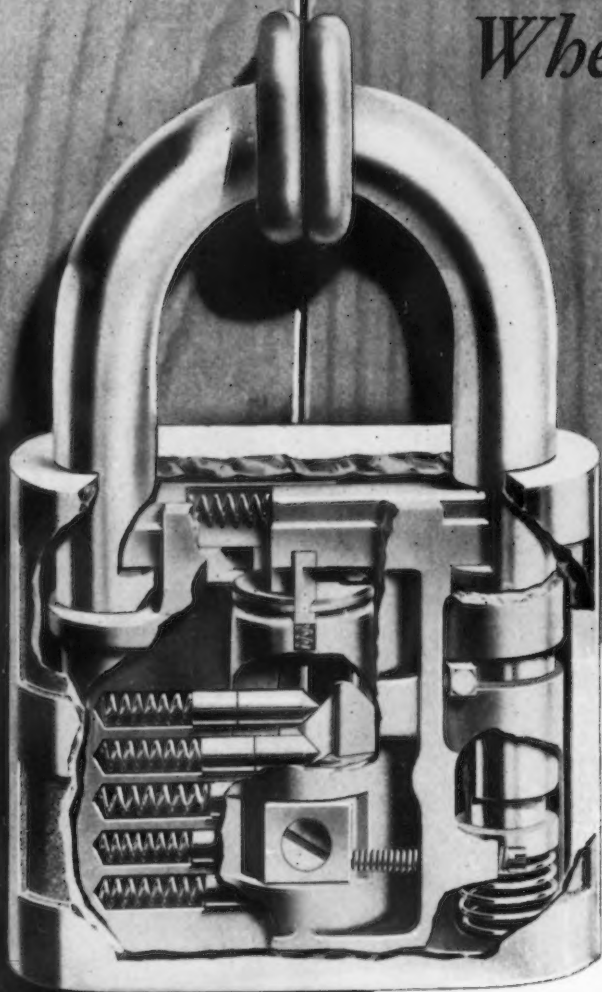
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APRIL 23, 1936

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"With Malice Toward None"

PRESIDENT ROOSEVELT is quite right in saying that the practical solution of our unemployment problem must come from business and industry rather than from acts of the Administration or of Congress. He may also be right in saying that he suffers from a lack of cooperation from industry and business to accomplish this highly necessary purpose. But it might be added such cooperation has been made impossible through his own actions and attitudes.

A situation such as we face today calls for great statesmen and conciliators and not for demagogues. The need is to heal old wounds, not to open new ones. No man or group **can** cooperate with another man or group that has demonstrated an ingrained spirit of animosity. That is true in all human relationships both private and public. The laborer whose boss "has a pick" on him may work because he has to but it will be grudgingly.

The great conciliator, Abraham Lincoln, knew that his own attitude of mind and heart was the primary and determining factor in solving the Nation's perplexing problem. He made this clear in his second inaugural address, when he said:

"With malice toward none, with charity for all; with firmness in the right, as God gives us to see the right, let us strive to finish the work we are in. . . ."

The bitterest Confederate knew that there was no malice in Lincoln's heart, knew that he hated neither slavery nor the slave owners; realized that he was not "out to get" any individual, group or class, but that his great compelling motive was justice and charity for all. This attitude of heart and mind saved and reunited our Republic. A demagogue in Lincoln's shoes would have ruined it.

A demagogue in Lincoln's shoes would have stumped the country hurling recriminations at the slave owners, he would have called them "Tories and reactionaries," he would have ridiculed them and sneered at them, building up a natural resentment that would have made true cooperation impossible when the belated olive branch had been produced.

We need today the best that industry and business can give in the way of help toward the solution of our pressing economic problems. We need the spirit of cooperation as contrasted with the spirit of antagonism. We shall not get it and cannot get it until there is reborn, in Washington, a Government imbued, as Lincoln's was, "with malice toward none, with charity for all."

John Van Dine



RUSTLESS STEELS

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THE steel industry's pampered brood of children, corrosion and heat-resisting alloy steels, have developed some semblance of adulthood. Of course, big-brother-carbon steel's contribution to the family treasury still far overtops the comparatively paltry \$55,000,000 returned last year by rolled and cast Cr and Cr-Ni alloys. However, all indications point to an ascending star of destiny for the family favorites. They have reestablished a reputation for dependability, they have attracted a sizable and influential following, and high hopes are held for an increasingly successful and profitable future for these types of steels.

Like any youthful prodigy, the Cr and Cr-Ni steels in their childhood were urged and even forced to tasks beyond their natural capacities. A reaction was inevitable, and this reaction, combined with the widespread deflationary influences prevailing between 1930 and 1933, resulted in a relapse which left the steels almost incapacitated.

However, an educational program to publicize the correct steels for particular purposes, further research to develop improved physical properties, and stable selling prices all served to bring these steels well back along the road to recovery. That this recovery has been sound is proved by the fact that 1935 production of Cr and Cr-Ni alloy steel ingots advanced to 67,227 net tons, which represents a 54 per cent increase over 1934 production and is 23 per cent greater than the 54,949 tons, produced in the more carefree days of 1930. Castings, likewise, had an impressive production rise in 1935. Output of all cast Cr and Cr-Ni alloy "irons" and "steels" totaled 3971 tons for the 12 months, which is a 38 per cent advance over the 1934 level and is only 15 per cent under 1929 output, the record year for the industry.

The outlook for the current year and succeeding periods is just as significant as the impressive advance in production during 1935. Undeniably, Cr and Cr-Ni steels have secured for themselves a comfortable niche in the industrial world, and all indications point to constantly expanding markets. It is not inconceivable that these steels will ultimately occupy a position overshadowing the now-dominant carbon or plain steels. How-

ever, a realization of this end will come only after many years of research to extend applications and reduce costs.

So far, the use of Cr and Cr-Ni steels has been costly, and for this reason they have been employed only where they could prove a definite economic or esthetic advantage. High costs have effectively barred them from entering the great tonnage markets where they would be in direct competition with mild steels and certain non-ferrous metals, and, furthermore, all indications point toward the maintenance of this bar for some time to come. Not that the many alloy makers are not endeavoring to reduce cost, but the nature of the product makes it difficult to attain the desired end.

A few buyers assume that some price disorganization may obtain by 1937, directly attributable to the expiration of certain basic Strauss and Haynes patents controlled by the Chemical Foundation, Inc., and American Stainless Steel Co. respectively. However, a consumer with this attitude fails to consider the fact that other patents are impending, several of which are of such basic importance that if and when they are issued the industry would be dominated for the next 17 years in much the same manner

Production for 1935 Establishes New Record

Expiring Patents May Disorganize Markets

By T. W. LIPPERT

Metallurgical Editor, The Iron Age

o o o

that has been the case in the past 17 years. Furthermore, steel producers are hardly in a position to make price concessions in view of the indisputable fact that even now more than one type of steel is sold near its cost level or even below cost in some instances.

These few observations serve to demonstrate the many ramifications in the manufacturing and marketing of chrome and chrome-nickel alloy steels. One established fact is that 1935 activity was far greater than for any preceding year. Equally apparent is the fact that changes are in the offing because of expiring and impending basic patents. Furthermore, considerable research work is under way to improve the performance and reduce the cost (at least fractionally) of corrosion and heat-resisting steels.

The patent situation is complex to an exasperating degree. Nevertheless the influence of patents and the outlook for rustless steel production and consumption both are worthy of more detailed treatment. Consequently they will again be discussed at the end of this article. The paragraphs which follow are of immediate importance inasmuch as they deal with the 1935 production figures.

As in previous years, THE IRON

AGE has surveyed the industry to determine the 1935 production of corrosion and heat-resisting alloy steels both in the rolled and in the cast condition. Furthermore, this production is broken down with respect to broad analysis groups and listed according to the individual finished steel products. The production and a partial analysis breakdown for ingots is shown graphically in Fig. 1, and a more detailed statistical presentation for both ingots and castings for the period 1929 to 1935 is available in Table 1. The 1935 output of finished steel, listed both by product and by analysis, is shown in Table II. The 1935 survey is believed to be a slight improvement over its predecessors for the reason that two additional analysis groups are included, thereby resulting in a more complete breakdown.

Both primary and secondary producers cooperated to give a true picture of 1935 finished steel production segregated into types of products and analyses. As in previous years, one primary and two secondary producers refused to submit figures, but certain deductions

served to effectively establish the activities of these three mills. Thus the 67,227 tons of ingots shown in Table I as the total 1935 output is believed to be accurate to within several per cent.

As a check on this accuracy, note that 1935 production of 18 Cr-8 Ni steel amounted to 33,114 tons and the output of 25 Cr-12 Ni steel totaled 2827 tons. These two together amount to 35,941 tons, which is a fair approximation of the 41,714 tons reported officially to the Chemical Foundation as the year's total for all Cr and Cr-Ni alloys. There is a difference of 5773 tons between the two figures, but all of this difference is probably represented in various Cr and Cr-Ni combinations included in the "all other" group of THE IRON AGE survey.

In reporting finished steel production there is bound to be slightly more attendant error than for ingots. For instance, a primary mill may report a production of wire rods which would appear under the heading of wire. But some of these rods may be sold to a converting mill. The latter mill's report for wire production is a partial duplication of that appearing in the report from the primary producer. Careful checking of the figures served to keep this type of duplication to a minimum.

This survey of production natu-

TABLE I

Production of Corrosion and Heat-Resisting Steel in the United States (1929-1935)

	(Net Tons)						
Ingots:	1929	1930	1931	1932	1933	1934	1935
18 per cent Cr and 8 per cent Ni...	21,074	34,867	14,740	9,209	19,620	24,818	33,114
25 per cent Cr and 12 per cent Ni...	.....	.....	.....	.....	.....	.....	2,827
12 to 14 per cent Cr (approx.).....	14,552	8,821	5,397	2,900	7,401	8,658	8,340
16 to 18 per cent Cr (approx.).....	10,127	7,995	7,483	6,751	4,969	6,242	11,256
18 to 30 per cent Cr (approx.).....	.....	.....	.....	.....	.....	.....	1,306
All others (Cr and Cr-Ni).....	2,950	2,792	2,438	4,312	4,262	3,977	10,384
Not allocated	187	474	622	660	.....	.....	.....
Total	48,890	54,949	30,680	23,832	36,252	43,695	67,227
Castings:							
18 per cent Cr and 8 per cent Ni...	103	271	225	384	352	387	446
25 per cent Cr and 12 per cent Ni...	.....	.....	.....	.....	.....	.....	760
12 to 14 per cent Cr (approx.).....	15	15	29	23	36	164	148
16 to 18 per cent Cr (approx.).....	37	96	192	237	225	86	288
18 to 30 per cent Cr (approx.).....	.....	.....	.....	.....	.....	.....	262
All others (Cr and Cr-Ni).....	3,035	2,930	2,264	1,857	2,026	2,218	2,054
Not allocated	1,392	1,009	511	285	54	19	13
Total	4,582	4,321	3,221	2,786	2,693	2,874	3,971
GRAND TOTAL (ingots and castings)	53,472	59,270	33,901	26,618	38,945	46,569	71,198

rally included both high and low-carbon chromium and chrome-nickel steels. Comparatively few valve steels are covered in the report, and no attempt was made to secure production figures for steels running lower than 5 per cent in Ni or Cr content. Neither are alloys analyzing over 35 per cent chromium or 25 per cent nickel included. A number of the less-common Cr-Ni combinations and straight chromes are necessarily included in the "all other" group of Table I inasmuch as too elaborate an analyses break-down would complicate the survey. For instance, a steel such as the increasingly popular airplane construction alloy which analyzes about 16 per cent Cr and 1 to 2 per cent Ni appears in the "all other" grouping rather than in an individual classification.

A comparison of the finished steel output in Table II and the ingot production in Table I discloses an apparent average ingot yield of 49 per cent. That is, with ingot output at 67,227 tons and total finished steel production totaling 33,185 tons, there is apparently only about a 50 per cent loss for conversion and finishing operations. Inasmuch as most mills show a conversion loss greater than 50 per cent, it is probable that the 1935 ingot and finished steel relationship is slightly awry, due to carry-overs

at the first of the year. Occasionally, for instance, some producers report sales rather than production, and carryovers in such instances would exert a distinct influence.

A few words regarding the production figures shown in Table II might be of interest. For the sake of simplicity, these observations will be grouped in individual finished steel classifications.

Sheets

Sheet consumption at 11,646 tons exceeded any one other finished steel group during 1935, and the 18 and 8 grade was the most popular analysis. The 18 and 8 combination in sheet form is favored by architects for decorative purposes, for navy construction, railroad trains, food containers, for restaurant equipment, etc., etc. Second to 18 and 8 in point of consumption during 1935 was the 16 to 18 per cent straight chrome grade. Low-carbon "stainless irons" of this group are increasingly popular, for they are cheaper (in the absence of nickel), ductile and have excellent corrosion resistance. Chrome alloys of this type are used in the chemical industries, for automobile trimmings, cafeteria equipment, etc. The lower chromium grade (12 to 14 per cent Cr with high carbon) finds application in the cutlery and allied

fields, and the higher chromium grade (over 20 per cent Cr and both high and low carbon) find their greatest uses in low pressure apparatus which is subject to oxidation up to 2000 deg. F., i. e., furnace parts, annealing ovens, muffles, and for other high-temperature applications where resistance to corrosion and abrasion are paramount.

Bars and Rods

Steel in this classification is second to sheets with respect to yearly consumption, the 1935 total being 9159 tons, as shown in Table II. The uses and attributes of bars and rods are very similar to those stated for sheets in the preceding paragraph. Besides being used as bars and rods *per se*, much of this steel goes to make rivets, bolts, nuts, etc.

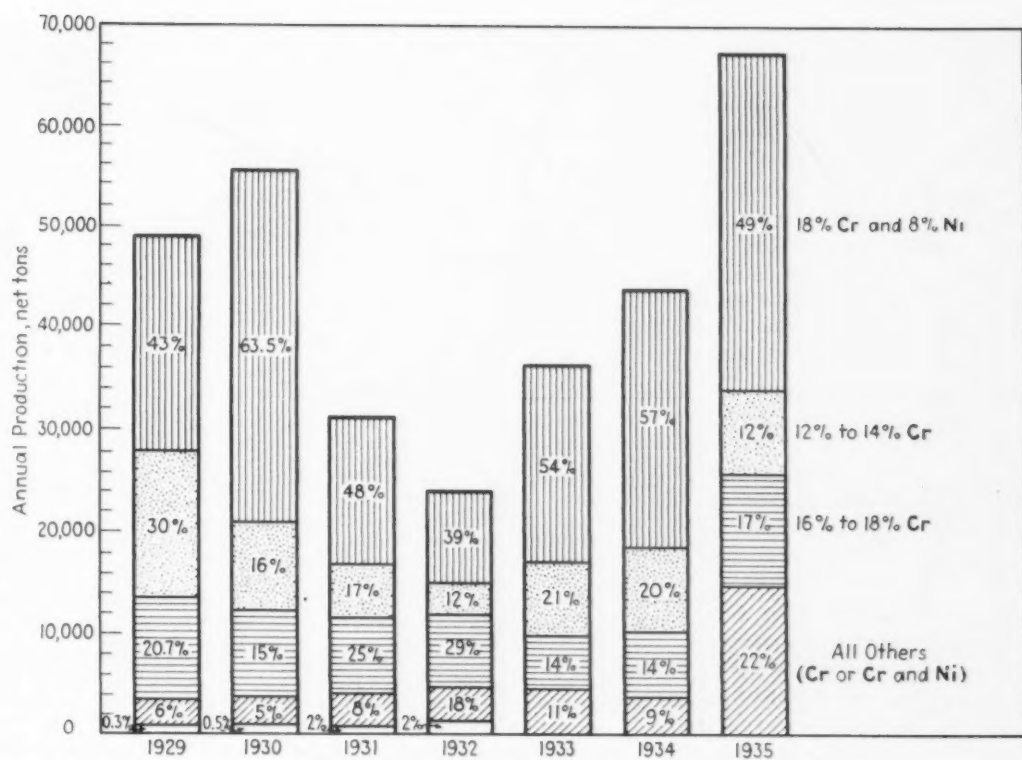
Strip

Strip production for the year, which totaled 6203 tons, was somewhat lower than was anticipated, in view of the well publicized uses of chrome-nickel grades in this form. Of the 4264 tons of 18 and 8 made, about 300 tons went into the construction of stainless steel trains, mostly 14 to 20 gage and less than 13 in. wide. Furthermore, it is known that almost 2500 tons of this type must go into similar trains during the current year, provided the orders now on books and being considered are carried through without delay. The automobile industry took considerable strip during 1935, and consumption for the current year should be even greater. Strip of the 18 and 8 type is ever popular for interior decoration and architectural details, table cutlery, etc. Table II also shows sizable productions in the 12 to 14 and 16 to 18 straight chrome groups. These steels usually are low in carbon, and, depending on the heat treatment, they go into many consuming outlets, varying from applications where strength is more important than high corrosion resistance to applications where resistance is paramount and strength secondary.

Wire

A total 1935 production of 672 tons has been reported, with the 18 and 8 grade the most popular and the 16 to 18 straight chrome "steels" and "irons" a close second. A good volume of 18 and 8 wire was used for automobile steering

THIS graph shows yearly ingot production figures and analysis distributions for the past seven years and is a condensation of more detailed data listed in Table I. The blank spaces shown prior to 1933 represent unallocated tonnages. Table I gives production data for 18 Cr-12 Ni and 18-30 Cr alloys for the 1935 period, but these totals are lumped in the "all other" group here in order that the graph be consistent for the entire seven-year period.



wheels last year; some of this production appears under wire and some under rods in Table II. The wire tonnage includes the production of welding wire, small drawn shapes, wire cloths, screens, etc. Heretofore the high-chrome grades have had only limited call, particularly in the fine wire sizes. However, the production figures in Table II show that these analyses are increasingly popular, probably because of their low base price and average excellent corrosion resistance. Larger size wire in the 16 to 18 Cr group have found a better outlet in cold forming and heating operations inasmuch as corrosion resistance is usually satisfactory and die wear less than for the 18 and 8 analysis.

Tubular Goods

Since the initial manufacture in 1922, there has been an average upward trend in the demand for tubing made from corrosion or heat-resisting nickel-chromium or straight nickel steels and "irons." The 1935 production of 3323 tons is quite impressive. The 18 and 8 austenitic type was the most popular analysis, with the 16 to 20 chromium ferritic type in second place. Contrary to general expectations, 148 tons of the 12 to 14 per cent Cr (low carbon) tubing was made in 1935. This grade is en-

joying more popularity, particularly because of its moderate cost, high strength when heat treated and fair degree of corrosion resistance. Equally surprising is the 146 tons of 18 to 30 per cent chromium-iron tubes produced in 1935. These analyses are usually sold in hot finished sizes inasmuch as cold drawing is attended with many difficulties. Steels having 2½ to 5 per cent Cr are sold in large quantities in tubular form to steam plants and the petroleum industry, but they are not included in the survey as they are not truly stainless, though they do have considerable chemical stability.

Forgings

Most of the chrome-nickel and straight chrome steels and irons are forged without any great difficulty. As shown in Table II, the 18 and 8 grade was the most popular forging analysis in 1935, with the 12 to 14 per cent chrome grade a close second. Most forgings are small and find applications where strength, toughness, hardness, abrasion and corrosion resistance are paramount.

Castings Production Higher

For accuracy's sake, the admission must be made that tonnage returns from foundries have not this year or in the past been as accurate

as those from ingot producers and converting mills. Three large producers of castings and several small melters refused to supply either their total tonnage or breakdown figures, but, as in the case of the ingot survey, an attempt was made to estimate these missing figures. The totals shown in Table I for castings are believed to be accurate to within 5 per cent.

The refusal of full foundry cooperation springs directly from the negative sentiment for such a public survey on the part of the Alloy Casting Association, Inc., the trade association of alloy founders. The Alloy Association's *raison d'être* is the protection of member companies, and, for this reason, its stand is well taken in one respect, i.e., publicity showing increased demand for Cr and Cr-Ni castings naturally encourages many small foundries to enter what purportedly is an active and lucrative field of operation. Many of these foundries turn out poor alloy castings which in turn give rise to consumer resentment against alloys in general. Furthermore, in their efforts to secure business, some of these foundries drive prices down to unprofitable levels.

Despite the rapid growth in demand for corrosion and heat-resisting castings, the idle capacity in this country is still almost four

times the 1935 production. Also, the capacity that is being operated to fill current needs is not particularly profitable because of recurring price weakness, the general vicissitudes of alloy foundry operations, and the necessity of financing extensive experiments to solve their own production problems and help their customers to secure a satisfactory analysis for a certain application.

Nevertheless, statistics on castings production are increasingly important in view of the many changes taking place in the industry. For this reason, 1935 activity for foundries making corrosion and heat-resisting irons and steels is shown in Table 1.

It is evident that alloy founding has enjoyed a pleasant increase in business during the past year, for total production of all analyses amounted to 3971 tons, representing a 38 per cent increase over 1934 activity. The 1935 output, however, was still somewhat under the 4582 tons made during the peak year, 1929.

Castings in the 25 Cr-12 Ni group (CN-36 or 37) were evidently the most popular with users during 1935. Production in this category totaled 760 tons. Several concerns prefer this analysis for castings which must be welded into a rolled steel assembly made of 18 and 8. Oddly enough, the 25-12 analysis functions better in such an assembly than an 18 and 8 casting for certain applications. The sulphite and paper industries use castings in the 25 Cr-12 Ni or nearby groups, and castings of the 29 Cr-9 Ni type (CN-33) are used

in marine applications, in the rayon industry, for resistance to nitric, phosphoric and some organic acids.

The 18 and 8 analysis was the second most popular casting in 1935, with production at about 446 tons. Only about 10 foundries make 18 and 8, and this grade of steel has never been as popular with founders as it has in the rolling mill. It finds its greatest applications for pump fittings, gas blowers, and a host of other uses where resistance to corrosion is a primary requisite.

The straight chrome grades (under 1 per cent C) show a sizable production record for the year. These alloys find their greatest use in resisting exposure at high temperatures and under the oxidizing conditions of sulphur, nitrogen, etc. So long as the atmosphere is oxidizing, the alloys perform safely, therefore they also find use in industrial furnaces, to conduct carbon monoxide and resist flue gas.

Expiring Patents, Uncertain Future

The foregoing demonstrates the multiplicity of application and growing consumer acceptance of alloys belonging to the corrosion and heat-resisting groups. Manifestly such a growth of a new industry is the result of, primarily, intensive research work to perfect new analyses and extend applications, and, of secondary importance, a period of helpful patent administration. The patent situation has long been of interest inasmuch as it is a perfect example of how certain basic patents can

blanket an entire industry, and, notwithstanding, foster the industry's growth.

The history of the chrome-nickel "product" patents is generally known. Early in the century, when Harry Brearley of Sheffield was examining chrome steels for a gun lining alloy, a German professor, Dr. Benno Strauss, secured valuable data on a range of iron-chromium-nickel alloys. Original patents were filed in 1913, but the war shifted ownership of two of the most important patents from Krupp, the original assignee, to the government-established alien property custodian, which in turn transferred them to the Chemical Foundation, Inc. This latter organization has since administered the patents.

The Foundation's royalty charge is not large and has in part been devoted to research in the industry's behalf, licenses have been distributed widely and it has constantly urged all companies to charge profitable prices for their products. Producers use recommended base prices and extra lists, and many sellers admit that general acceptance of these quotations has definitely improved the status of the industry.

The two Benno Strauss patents broadly cover all articles which are used for resisting corrosion and which contain 6 to 25 per cent chromium, $\frac{1}{2}$ to 20 per cent nickel and not over 1 per cent carbon, the proportion of chromium increasing as the proportion of nickel decreases and vice versa. Likewise covered are all articles which must have great strength and great

TABLE II
Product and Analysis Breakdown for 1935 Production of Corrosion and Heat-Resisting Alloy Steels
(Net Tons)

Type of Finished Steel	Analysis Groups, Per Cent Composition						Total Output, All Analyses
	18 Cr, 8 Ni	25 Cr, 12 Ni	12 to 14 Cr	16 to 18 Cr	18 to 30 Cr	All Others (Cr or Cr-Ni)	
Sheets	7,503	155	875	1,583	91	1,439	11,646
Bars and rods	3,105	801	1,517	2,380	3	1,353	9,159
Strip (hot and cold-rolled)	4,264	268	698	667	37	269	6,203
Tubular goods	898	45	148	264	146	1,822	3,323
Plates and shapes	523	341	281	84	4	437	1,670
Wire	304	8	134	208	3	15	672
Forgings	218	62	149	33	18	32	512
Total (by analysis)	16,815	1,680	3,802	5,219	302	5,367	= 33,185

GRAND TOTAL, all finished steels, all analyses = 33,185 net tons.



The Midvale Co.

RUSTLESS steels are born in the electric furnace. It's an expensive alloy, and makers realize that the tonnage markets will not be theirs until costs are curtailed. No technological price reduction is anticipated in the near future, but much effort is directed toward this end, and success will be the inevitable result. The Wild process, the Wiles hollow-electrode furnace. Fields experiments on high-carbon ferrochrome, attempts to employ the open-hearth are all small steps toward the distant objective.

resistance against the action of acids, said articles being made from steel alloys containing from 15 to 40 per cent chromium, 20 to 4 per cent nickel, not over 1 per cent carbon and not less than 55 per cent iron.

It is apparent why all principal makers of corrosion and heat-resisting steels must operate under Strauss patents inasmuch as practically every analysis they make comes within the chrome-nickel limits specified. One Strauss patent expires on Sept. 23, 1936, the other expires May 4, 1937, and the two less-important patents that Krupp retained cease functioning in 1939.

Of course, the Strauss patents do not cover the high-chrome "steels" and "irons" used for resistance against heat and acid corrosion. Many of these alloys, however, came within the range specified by the Haynes patent, administered by American Stainless Steel Co., and controlling all products used for heat and corrosion resisting purposes which analyze 8 to 60 per cent chromium and 0.10 to 1 per cent carbon and permits the inclusion of a number of other elements such as molybdenum, vanadium, etc. Much rolled steel and many castings come within this range. The Haynes

patent expired April 1, 1936, and, excepting the Clements and Cox patents, was about the last of the basic patents on high-chrome alloys.

That the entire field will soon be free of many patent basic patents is apparent. But this freedom is deceptive for Milton's words "confusion worse confounded" is descriptive of the situation. In the offing is a multitude of other patents which, if and when granted, will exert a definite influence on the industry. Also, to further complicate the picture is the fact that over 257 other patents exist today which cover minute divisions of the industry but have no broad influence.

A dramatic development would be the announcement of a new analysis which is even better than the original Strauss alloys, or, of similar influence, a new process which would be superior and cheaper than existing ways of making rustless and corrosion-resisting alloys. The former is the more likely of the two. Such a development might be of such basic value that all producers would seek licensing arrangements, thereby extending a domination similar to that enjoyed by the Chemical Foundation for the past 17 years.

An event of the past year was an

effort of Krupp Nirosta Co., Inc., and Benno Strauss to secure United States patents on alloys which are essentially like those covered by the original Strauss claims only that the carbon content is lower. The new Strauss claims, as advanced by Krupp Nirosta Co., Inc., cover all metal articles which, although welded, must resist active corrosive influences *without* subsequent annealing, said articles being made of austenitic chrome-nickel steel having 18 to 25 per cent chromium, 7 to 12 per cent nickel, and the carbon content (less than 0.07 per cent) so determined that the austenitic texture of the alloy does not get lost even by heating up to within 600 to 900 deg. C. The patent, therefore, covers the procedure whereby grain boundary corrosion is minimized through a lowering of carbon. Such corrosion can be prevented by reheating, which is a common practice, or through the use of titanium, columbium, etc., a practice which is daily finding more favor.

The Commissioner of Patents refused to accept these claims, and the Supreme Court of the District of Columbia upheld the patent office in a decision handed down March 13 of this year. This deci-

(CONTINUED ON PAGE 99)

Bird's Eye View

MUST we go on rations? Is there a scarcity of natural resources, agricultural products, as the reformers of the American System would have the Nation believe? Has the Constitution outlived its usefulness?

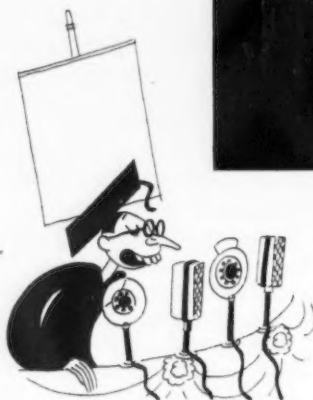
Fourth in Series of Articles on the preservation of the American System of Enterprise.

o o o



IT seems to be the fashion these days for certain loquacious Government officials to preach the approaching end of our National resources and the need for tightening our belts and altering our entire social, political and economical system. Men of good sense stand aghast at the havoc being wrought in the complex and balanced mechanism, which is this Nation, by these ebullient amateurs. The weak-kneed and unthinking, indeed, are taken in by the very volume and dogmatism of the utterances of men in the highest positions in Government and agree that there is nothing for it but to throw our tried and staunch Constitution out of the window and adopt the gentle system of the U.S.S.R.—to exchange a Washington for a Stalin.

Why? Because, they say, we have reached the same stage of exhaustion of natural resources as have the European nations. We



must, therefore, use the same means of dole and diet—not to extricate ourselves from a world depression brought on and prolonged by their mania for wars—but forevermore.

With this thesis, we sharply disagree, on the very simple ground that it is demonstrably without a word of truth.

Whatever one's business may be—making steel, selling it or using it—it is a good idea to step away from it once in awhile



By MORGAN

FAR

and see what it looks like from the outside. This is to get back a perspective, lost by living too close to the job. That perspective will soon return and, with it, new ideas to try out in business and new strength to make them work.

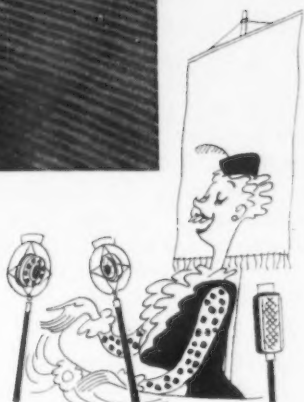
The same thing is true of the whole complicated business of a Nation. We have been so close to it as it slid downhill, that we are still wondering whether it has hit bottom, is on the upgrade or is just standing still. Indeed, there is a fair number of our fellow-citizens, who are wondering whether things will ever be the same again. Perhaps all of us have had at least one fleeting impression that that might be so. Let us see.

w of America



FARRELL

*Director, Chilton Bureau
of Economic Research*



When we are frightened about a thing the proper procedure is to take a long, careful look at it. In nearly every case we shall see that there is nothing to be frightened about.

Now, it is impossible to read the headlines day after day, without feeling a little panicky. "Germany occupies Rhineland—France mans border forts—Baldwin says war in four years—Italy pushes on—Japan faces Soviets in Mongolia."

Very cheering.

And at home: "Billion new taxes must be raised—Workers and farmers must unite says So-and-so—Sixty-five billions for housing—Eleven million still unemployed."

It is hard to keep one's head amid all the clamor, hard to remember that a sensational press is always beating the war-drums, aided and abetted by the hysterical antics of their radio and news-reel competitors.

It is equally hard to keep before one's eyes a picture of America, the strong, solid land with all its resources, its railroads, cities, people, as it really is, not as the alarmists would have us see it.

Therefore it is worth the effort to

take a detached view of this land of ours, today, to see if it has changed so much that a brand new way of living and working is called for—or whether the old way will do.

A passenger by plane, flying from coast to coast, gets a true impression of America—of a thousand miles of rolling meadow land in the northeast; a thousand miles of pine forests in the southeast; a thousand miles of fertile prairies west of the Mississippi—all flanked by the mineral-packed towers of the Rockies and the coastal orchards of the Pacific shores.

There seems to be plenty of room for development here. It does not look as though we had to skimp in using our natural resources. Certainly it does not look as though the Government has to take over a meager output of food and goods to see that they shall go around. We are not talking here of Emergency Relief but of the normal course of living.

Take land. There are just under three million square miles in the United States. Since it is the custom these days to deal in astronomical figures, call it 1907 million acres which it is. Of this, 500 million acres are forest land, almost 1000 million farm land, including 413 million acres of grazing land. The rest is just land and mountains, rivers and lakes, deserts and swamps.

Of the thousand million acres of farm land, a little over half is improved—by cultivation, planting or



other agricultural effort. And of this half-billion acres, nearly all have borne crops at no distant date in the past. *But they are not needed any more.* In 1932, 360 million acres were in crops. By 1934 this had shrunk to 290 million. Secretary Wallace says in his 1935 report that this is about the acreage needed at present.

There are several reasons for this decrease in crop acreage. First, ten million horses and mules have disappeared since the advent of the tractor; second, ten million steers have disappeared because people eat less beef, both releasing immense areas of hay and grain land; third, intensive methods of cultivation produce more yield per acre than the increase in population requires.

Thus we have nearly twice as much improved farm land as we require and more than three times as much over-all farm acreage. By way of comparison, France, a fairly self-contained nation, feeds her population, which is one-third as numerous as ours, on one-fifth the arable land—which is all she has.

It would seem, then, that we do not have to worry about insufficient farm land, especially as the best authorities assure us that our population, at the present rate of going, will reach about one hundred and fifty million in twenty years and decline again to something like the present number.¹⁰

Horses, Cows and Chickens

As for farm animals, we have some 17 million horses and mules, 61 million cattle, 50 million sheep, 37 million hogs and no less than 412 million chickens. We have six times as many animals (less the chickens) as Great Britain and five times as many as France, each with one-third our population. We even have one-third more than the

¹⁰See "The Population Problem and World Depression," by Louis I. Dublin, vice-president and statistician, Metropolitan Life Insurance Co.

Soviets although their population is one-third greater than ours.

Another resource, which is ample for our needs despite the sinful waste of it, is timber. Of the 500 million acres of forest land, 180 million bear big trees suitable for lumber. These trees will make 1-2/3 million million board feet of lumber. This is what that figure looks like: 1,667,000,000,000.

Nearly all the forest land could be made to produce under proper clearing and replacement, although at present we are committing the needless crime of using timber five times as fast as Nature can replace it. Here, as in the case of our other bounteous resources, the warning sign is posted: "Replace this."

In his latest report, the Secretary of Agriculture made a plea for the protection of wild-life both by law and by sanctuary, in lands best suited for food and fur-bearing wild creatures. That is one resource we can and should replace. Another is our fresh-water fish supply, which will be instantly resurrected as soon as we stop using our streams as open sewers.

Minerals and Oils

Turning to our chief minerals, coal, oil and iron, there seems to be no dearth to worry about. Prudence, to be sure, dictates that a resource, which, once used is gone, should not be wasted. Here is one place for Government regulation—to see that those things are not wastefully extracted.

We have been mining over 400 million tons of coal a year, since the nearly Nineteen Hundreds and there is still no apparent diminution in the available supply. According to competent authority it should last for centuries.

Obviously the pools of petroleum trapped in rock pockets and contained in vast subterranean beaches of oil-soaked sand, have a very definite life-span. There are about

twelve billion barrels in known pools and we use 900 million barrels a year. Some new pools will doubtless be discovered but, even if they are not, we have oil-shale deposits enough to produce 100 billion barrels, according to President Byles of the American Petroleum Institute. After that we can fall back upon the distillation of soft coal, the supply of which is practically unlimited.

Eighty-five per cent of the iron ore mined each year comes from the Lake Superior district, where the ore can be stripped from the surface of the ground in great shovelfuls and loaded directly into the cars. There seems to be no end to the deposits of hematite ore containing eighty-five per cent of iron. Here we are skimming the cream and can continue to do so indefinitely. And when we are through, if ever, there is plenty more good ore in Alabama, Pennsylvania, New Jersey, Colorado, Arkansas, Missouri—in fact about every mountainous State in the Union.

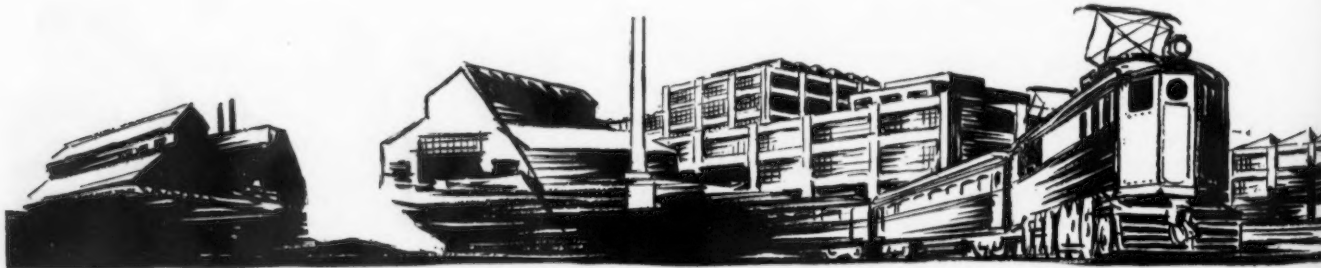
Besides these we have nearly every mineral needed in modern industry in abundance — except a very few like manganese—and we may find them.

Water Power and Climate

Add to all these natural resources the water power of our great rivers. The total horsepower to be generated at fourteen dam operations now being carried on by the Government is 7,808,000 hp., almost one-fifth of the power used by all our manufactures.

Lastly, consider that our climate is the most favorable to the promotion of the greatest human activities for the longest period during the year—that of the Temperate Zone.

There we have a bird's eye view of the natural resources with which Nature has so generously endowed us. Seen in their true perspective, they are ample to in-



sure us in the continuance and advancement of our way of living for a long time to come.

Do you see anything in this prosperous inventory of our natural goods which would for a moment suggest the abandonment of our American System of development through the initiative of every one of us?

The Constitution

Yet that is precisely what a great many of our people actually propose. It would be a serious mistake for business men, industrialists, property and home owners and all having a substantial share in America, to overlook the ominous implications of that fact.

We are not speaking here of the subversive elements among us, the communists, who bluntly announce as their fixed purpose the destruction of the Government of the United States.

No; we are talking of the man who lives next door, or sits at the next desk or comes into town every day on the eight-fourteen. It is amazing to hear these average citizens calmly express the opinion that there is nothing sacred about the Constitution, that it should be amended however and whenever it is considered necessary, that it exists to serve the people not vice versa and that if the people want a new one, the old one ought to go.

They, themselves, have seldom any suggestions to offer as to what form of instrument, interstate contract or set of rules and regulations is to supersede the Constitution, which they regard so lightly. Indeed they are rarely more definite than to state that they would have no objections to the amendment or even the elimination of the Constitution.

Communitistic Aims

Of course, the ruthless and determined men and women of the Communist Internationale who are

behind the incessant propaganda against the Constitution have very definite ideas of what *they* are driving at. Among the twenty-one conditions of admission into their organization are: "... the special obligation to carry on a vigorous and systematic propaganda in the army" (i.e. our army) also "within the trade unions, the worker's and shop councils, the consumer's co-operatives and other mass organizations of workers." It has "declared war upon the whole bourgeois world and all yellow social Democratic Parties."

All quotations are from the *contract* between the Third Internationale and the Communist Party of the United States. Your attention is particularly invited to this one: "In nearly every country in Europe and America the class struggle is entering upon the phase of civil war. In such circumstances the Communists can have no confidence in bourgeois legality. It is their duty to create everywhere a parallel, illegal organization machine, which, at the decisive moment, will be helpful to the party in fulfilling its duty to the revolution."

If you think these the pronouncements of a negligible minority consider this: The House Special Committee on Un-American Activities was given, a year ago, a list of six hundred communistic organizations, whose aim is to operate among the employed in every trade and the unemployed everywhere else, to convert them to the Third Internationale. Their membership cannot be far from 600,000. The record of the testimony before this Committee would interest those simple souls who close their eyes to the cancerous operations of these fanatics, both alien and home-grown, upon the healthy body of our Country.

These leaders in sedition are the men who want to discard the Constitution. They have among them gifted writers, artists, producers,

whose abilities are devoted to the spread of propaganda aimed at the complete subversion of our cherished institutions. The poison seeps through the veins of the body politic. Parlor socialists, theorists and visionaries take up the disease until finally plain John Citizen is inoculated and suddenly erupts into the opinion that the time may be ripe for a change: Maybe we have outlived the Constitution, maybe this is no longer a land of plenty, maybe we must hit the trail to Moscow.

We have seen in an earlier paper in this series what manner of men those were who signed the Declaration; who wrested their independence from the mightiest Power on Earth and who framed the Constitution for their own self-government. Probably never before or since have men of such high character and attainment joined their knowledge and talents to devise an instrument of Government of a free people. We all know what Gladstone said about it.

These men represented the last word in human evolution. Of their great-hearted Leader, the Father of his Country, we may safely say: "We shall not look upon his like again." Read again the Constitution they wrote. It is as perfect, as timeless as their own elevated purpose.

"We the people of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquillity, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution of the United States of America."

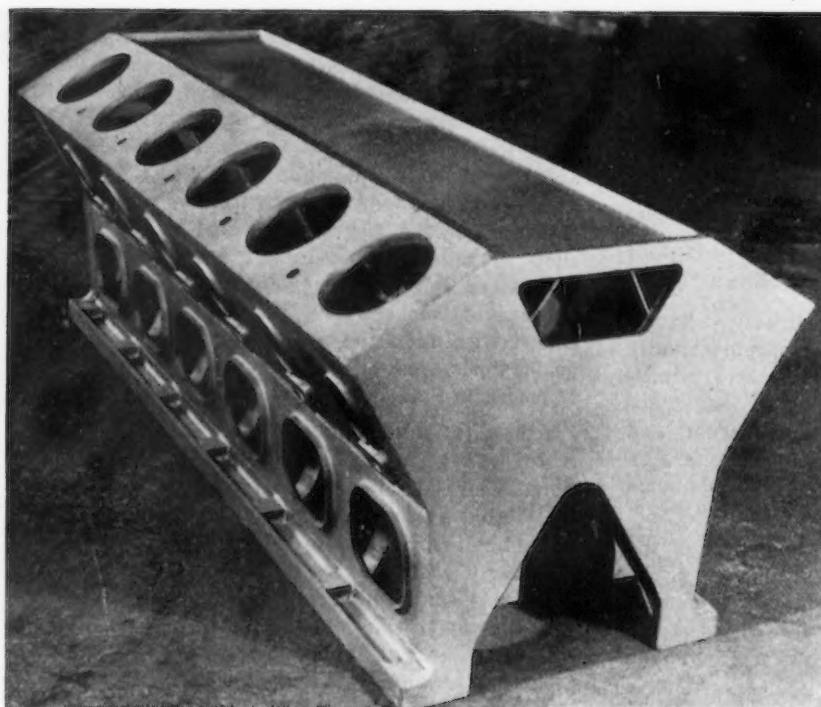
Balances and Checks

Then follows, in the first three articles, a simple, even elementary, definition of the powers of the legislative, the executive and the

(CONTINUED ON PAGE 99)



COMPLETED
chromium type
steel crankcase
weighing only 2.6 lb.
per hp. The engine
itself weighs less
than 10 lb. per hp.
running.



Low-Alloy, High- T



ONE of the most interesting developments in metallurgy during the past year has been that of low-alloy, high-tensile steels of a type suitable for fabrication in the as-rolled condition. Broadly speaking, such steels are not new as witnessed by the Eads Bridge, constructed in 1874 of metal supplied by the Chrome-Steel Co., the silicon steel in the Mauretania, the time-honored nickel steels in many bridges, and the medium-manganese steel in the Kill van Kull Bridge, as well as a great many other applications. Most of the above-mentioned steels have strengths of at least 85,000 lb. per sq. in. and 0.20 per cent or more carbon.

The newer types may be distinguished from the older, mainly in that the carbon content runs from 0.20 per cent down; in addition

they contain other alloying elements to improve either the mechanical characteristics or the corrosion resistance, or both. This may be stated in another way—namely, that in the newer types of steels an increasing importance has been placed on ductility, weldability and corrosion resistance.

Ductility and Uniformity Desirable

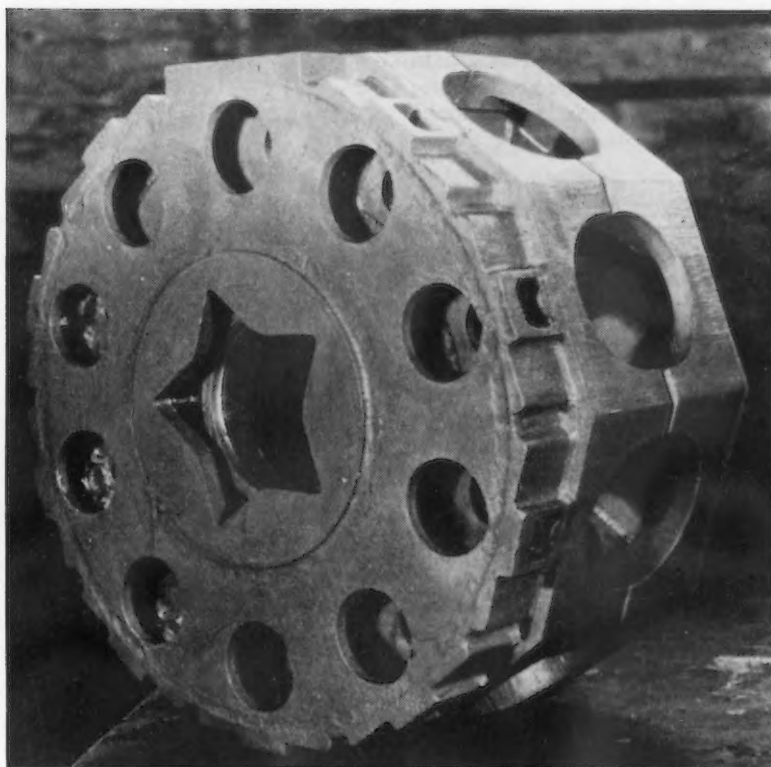
The characteristics desired in a high-strength, mild-alloy steel may be reviewed with profit. Higher ultimate strength obviously is the first criterion. With this, however, it is necessary that there be sufficient ductility for fabricating purposes and sufficient lack of sensitivity to minor variations in rolling conditions, rates of cooling and types of cooling from the welding operation, so that difficulties on these scores will not be encountered and the finished structure will—

ULTIMATE strength would still seem to be the major criterion for steels for lightweight construction, with ductility and insensitivity to welding operations as the prime adjuncts, and with im-

locally as well as generally—contain steel having the desired ductility as well as strength.

Design Fiber Stress Determination

To take advantage of the improved properties, the engineer uses a higher design stress. For the last century or more, the engineering profession has arrived at this figure by dividing the tensile strength of the material by a fac-



CRANKCASE for 10-cylinder, 450-hp, radial diesel. It is fabricated in two halves which are welded together. Main stress members such as the main wing, main web and ribs are chromium-type steel.

h- Tensile Steels

By A. B. KINZEL

Chief Metallurgist, Union Carbide and Carbon Research Laboratories, Inc., New York

proved corrosion resistance a desirable feature, states Doctor Kinzel in this interesting paper, presented at the March 10 meeting of the New York Section of the American Welding Society.

tor of safety. In this factor of safety, allowance is made for the combination of ignorance as to the properties of the steel, ignorance of exact stresses in the structure, ignorance as to service overloads on the structure, and ignorance as to uniformity of the materials and their behavior under special stress conditions. Gradually, as we learn more about steel and the properties to be measured and considered in

our structures, the various factors of ignorance with regard to the material are being reduced.

Yield strength and ultimate strength are two of the first properties to consider in determining a suitable factor of safety. In the design of a column, for instance, yield strength is very important because it is probably the determining factor with respect to possible ultimate failure. On the other hand, in applications where failure might be due to repetitive stresses induced either directly or by vibration, we are less interested in yield strength than in the fatigue limit, which is a direct function of the ultimate strength. The ultimate strength in this case is the controlling factor. It matters little by which of several alternative methods a final design figure is obtained, provided that this figure in itself is high enough to utilize best the

properties of the materials and still result in a safe structure—one that can stand any local overloading or general overloading to which it may be subjected in service.

Experience over many years has shown that a factor of safety applied to the ultimate strength results in safe structures. Of two steels, each having an ultimate strength of 80,000 lb. per sq. in., one may have a yield strength of 50,000 lb. per sq. in. and the other a yield strength of 70,000 lb. per sq. in. In either case, a design figure of 20,000 lb. per sq. in. can be obtained, by dividing the ultimate strength by 4, thus applying a factor of safety of 4 to the ultimate strength; but the yield strength would have to be divided by $2\frac{1}{2}$ in the case of the lower strength steel or by $3\frac{1}{2}$ in the case of the higher strength steel. If the higher yield strength figure were divided

by $2\frac{1}{2}$ instead of $3\frac{1}{2}$, a working stress would result which certainly would not be as safe as the 20,000 lb. per sq. in. value arrived at by the more conventional method.

Too High a Ratio of Yield to Tensile Strength

The possibility of having too high a ratio of yield strength to tensile strength should also be considered, especially when a member is subjected to a two- or three-dimensional stress. This applies particularly to ratios in excess of those current in the high-strength low-alloy steels developed in the last few years. The measurement of ductility is normally carried out in single-dimensional stress; but when a member is subjected to two- or three-dimensional stress, the effective yield strength is increased. Poisson's ratio approximates 0.3 for steel. This means that an equivalent two-dimensional stress effect would result in an apparent increase in tensional stress of about one-third. As long as the effective yield strength is increased to a point below the ultimate strength, plastic deformation can take place before failure. If, however, the increase in effective yield strength due to the two- or three-dimensional effect is such that the yield strength reaches the ultimate strength, the structure will fail at the effective yield point without plastic deformation. Thus, there is reason to maintain a definite spread between yield strength and ultimate strength, lest the ductility of the steel fail to play its role in a given type of service. Were structures actually stressed in service to a point approximating the relatively high yield strength of some of the newly envisaged steels, the situation might well be viewed with alarm. Knowledge of service conditions however, and the factor of safety, which is present because of limitations both of the material and of the design, redeem the situation.

To sum up this matter of choosing a design fiber stress: Most engineers today agree that it is necessary to consider each of the various properties of the steel.

Alloys for Uniform Strength and Ductility

Ductility is essential for a great many purposes, not only in ordinary fabrication in steel mills but also later in the shop, where the

steel must be formed successfully and worked into the final structure with the optimum results.

Steel manufactured in the mill on large-scale production is cooled as soon as it comes from rolls. For most economical production and particularly where large masses are involved, further heat-treatment is practically out of the question; that is, the steel must be used as-rolled. As-rolled steel should be relatively uniform notwithstanding the variations in finishing temperature and in rates of cooling that are encountered in shop practice. This means that the steels should be so alloyed that they will respond within the limits desired.

Although added strength can be obtained by increasing the carbon content, this would give strength at the sacrifice of ductility and further increase the sensitiveness of steels to mill conditions. Another way to increase the strength is to lower the carbon content and use alloying ingredients. This is the way of the new alloy steels.

Chart I.—Elements Used in Low-Alloy, High-Tensile Steels

Fe — C — O		
I	II	III
Cr	Si	Mn
V	Al	Ni
Mo		Cu
		P S

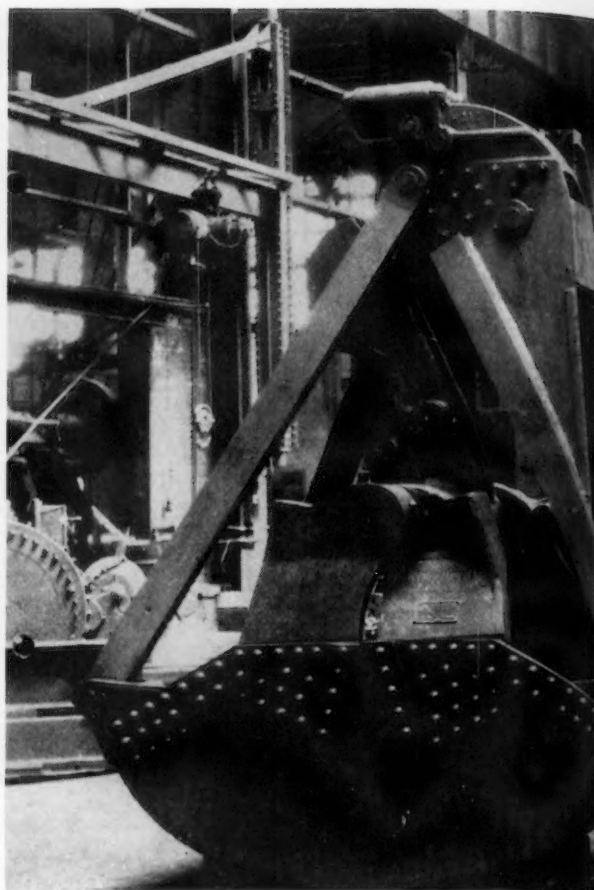
Of the alloying ingredients shown in the accompanying chart, the elements Fe-C-O, iron, carbon, and oxygen, may be considered as the base of our modern steels. As long as steel is manufactured by present or analogous processes, oxygen is going to be a factor. Phosphorus and sulphur are also present in the base. The elements largely used in the low-alloy steels manufactured today divide rather

naturally into three groups:

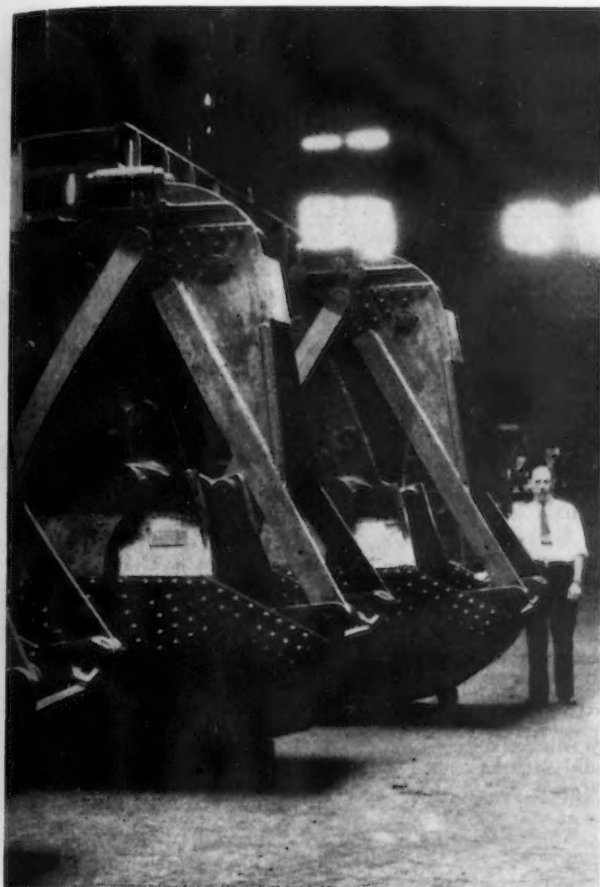
The first group contains the carbide formers, the second group the deoxidizers, and the third group the austenite formers. The elements in the first two groups are also alpha formers; that is, if these are present in sufficient quantity iron will not transform at any temperature and accordingly any heat-treatment is ineffective from the standpoint of hardening. Only the grain size might be affected. This alpha-forming tendency means that these elements are primarily soluble in ferrite. Because these elements are readily soluble in ferrite, their strengthening effect is twofold: first, their effect on the critical temperature, particularly with varying rates of cooling, and second, their effect in the ferrite matrix—the base of the steel, so to say.

Strength Achieved With Low Carbon Content

The elements in Group I raise the critical temperature a very small amount, on heating, but on



CLAMSHELL buckets, 4-yd., used in underwater dredging Bay Bridge. The dredging operations were carried on 200-ft. exceed 15,000 lb., chromium type steel was used for



operations for caisson foundations of the San Francisco-Oakland under water. As the total weight of each bucket was not to corner bars, which are welded to the head frame.

cooling at moderately rapid rates they markedly depress this transformation temperature. If present in the right amount in relation to carbon and other elements, the elements of Group I lower this critical temperature to such a point that the final structure is fine pearlite. Fine pearlite means high strength in the range under consideration. Not only will Group I elements produce this result, but silicon and the austenite formers likewise act in this direction; that is, the strength can be obtained with any one or any combination of the above elements. The austenite formers depress the critical point in two ways, but that is not important for our purposes. That the critical point is so depressed is the important factor. It means that strength is achieved with low carbon content, and thus ductility of a high order of magnitude. Broadly speaking, a 70,000 lb. per sq. in. low-alloy steel has the same ductility as the 45,000 lb. per sq. in. ordinary carbon steel, and a 90,000 lb. per sq. in. low-alloy steel has the same ductility as the 55,000 lb. per sq. in. standard boiler

plate. This shows the advance that has been made by the low-alloy steels.

Classifications of New Alloy Steels

The new alloy steels may be divided into three categories, depending upon the main alloying element used to get the increased strength, as follows: chromium steels, nickel steels, and manganese steels. There are several well-known types of chromium steels, among which the two best known in the United States are the ones containing 0.50 per cent chromium with 0.75 per cent silicon and 1.25 per cent manganese with or without copper, and the second containing 1 per cent chromium, 0.75 per cent silicon and 0.50 per

cent manganese, generally with copper and phosphorus. The carbon content of these steels is such that more of the carbide-forming element is present than necessary to satisfy the carbon, and strengthening of the steel results by means of solution in the ferrite as well as by finer, better-dispersed carbides. Because of the presence of chromium in the ferrite of these steels, there is no sharp differentiation from steels strengthened with non-carbide forming elements, although some metallurgists have emphasized such a distinction. Silicon renders the steel relatively insensitive to minor variations in the final rolling temperature and hot bed cooling conditions. Further characteristics of the steels with respect to weldability will be discussed later, together with those of the other two groups.

The second group in question contains from 0.50 to 2 per cent nickel and almost always from 0.50 to 1.50 per cent copper. Both the nickel and the copper are found in the ferrite grains in solid solution,

with the exception that precipitation of the copper may be achieved by suitable heat-treatment. This steel, too, is relatively insensitive to variations in mill operations. Modifications of the nickel steel include the use of molybdenum in quantities approximating 0.20 per cent and occasionally high silicon.

In the third group—the medium-manganese steels—the manganese is distributed between the carbides and the ferrite and the desired strengthening effect achieved. In general, these steels are peculiarly sensitive to mill conditions which must be either very carefully controlled or the steels given a normalizing treatment after rolling. The addition of molybdenum has been used to strengthen these steels further. The use of vanadium, however, renders the steels highly insensitive, and results in an order of uniformity and ductility in the as-rolled material equivalent to those of steels in the first two groups. Another modification of the medium-manganese steels, one which is not known in this country, but has been used considerably abroad, is the 1.50 per cent manganese steel with 0.50 per cent copper. Here again, the steel is quite sensitive to finishing conditions. Broadly speaking, the manganese-vanadium steel is the only one in this group which from the standpoint of fabrication may be placed in the same category as the best of the chromium and nickel steels mentioned above.

Influence of Carbon on Ductility

Most of the steels in question are made in two carbon grades—namely, one with maximum 0.14 per cent carbon or lower, and the second with carbon ranging from 0.18 to 0.23 per cent. Combined with this insensitivity to cooling rates, the lower carbon steels possess a high order of ductility so that in sheet form they may be readily pressed and formed. This ductility also serves a very useful purpose in the welded structures, in that it permits sufficient plastic deformation so that residual stresses are reduced to a minimum in the welding of any given structure. In order to achieve this ductility the carbon must remain at or below the 0.14 per cent limit quoted above, and with the alloying contents in question this automatically limits the ultimate strength to approximately 80,000 lb. per sq. in. or less. It is

significant that in European practice, construction has been restricted to steels having an ultimate strength of 73,000 lb. per sq. in., the thought being that more field experience is necessary before the higher strength can be used with assurance.

Same Ultimate Strength for Same Carbon Content

All three types of low-alloy steels have approximately the same ultimate strength for the same carbon content—that is, for balanced steels the ultimate strength is independent of the type of alloy ingredients, nickel-copper, manganese-vanadium, or chromium-silicon. With properly balanced amounts of the alloying constituents, the ultimate strength and ductility are a function of the carbon content and are relatively independent of the particular alloy combination used. This is probably fixed by the nature of the austenite-pearlite transformation. In each of the steels in question the transformation takes place at the same temperature and at approximately the same speed for a given rate of cooling, and the strengthening effect by solid solution is approximately of the same order of magnitude.

With higher carbon contents, deviations from the above may be expected, but even at the carbon content generally selected for the second level—namely, 0.18 to 0.23 per cent, the ultimate strength achieved with properly balanced alloying constituents, as well as the corresponding ductility still shows no great difference in the three groups mentioned. In this carbon range an ultimate strength of 90,000 to 100,000 lb. per sq. in. is usual.

Weldability from the Engineering Standpoint

The most important other factor from the standpoint of manufacturing industry today is the matter of weldability, not in the narrow sense of mere ability to make a good weld free from inclusions and blowholes but rather in the broad sense, the ability to make a joint satisfactory for engineering purposes. The amount of alloy present in the steels just described is such as to give no great difficulty from blowholes and inclusions to anyone experienced in the art. That, therefore, is not a factor to be considered seriously.

The effect of the heat of welding on the metal adjacent to the weld must, however, be given attention. Immediately, next to the weld there is a zone which has been in the mushy stage, between liquidus and solidus temperatures. Immediately back of this there is a zone that has been subjected to temperatures in excess of those normally recommended for heat-treatment. The next zone contains material subjected to the usual normalizing or hardening temperature, and beyond that is material actually in the critical range. Still further from the weld is a zone which has been subjected to a sub-critical annealing temperature, which if held long enough would result in a spheroidal structure.

As far as the mushy zone is concerned, the only matter of concern in alloy steels is segregation of the constituents. Metallurgists have long appreciated this, and naturally have so chosen their alloying additions as to avoid serious effects due to this phenomenon.

The next zone is that of rapid grain growth. If the temperature of this zone is maintained long enough, excessively large grains might result, but the time of welding is usually so short that this is not a matter of concern.

The zone subjected to normalizing temperature, and also the high temperature zone, do however require further consideration. As the welding operation progresses, the material in the normalizing zone is heated well into the austenite range, but is then quenched by transfer of heat into the cold mass of metal. A very drastic heat-treatment results.

Lower Carbon Steels Insensitive to Rapid Cooling

The new low-alloy steels with their carbon content below 0.14 per cent in the 75,000 to 85,000 lb. per sq. in. range are so insensitive to the rapid cooling under these conditions that the degree of hardening is inappreciable and the steels may be considered foolproof from this standpoint. This is particularly important and is true for all the steels of lower carbon content (under 0.14 per cent in general) in each one of the groups previously mentioned, no matter whether chromium, manganese or nickel is the alloy base.

In the higher carbon range of the steels in question, whose tensile

strengths are 90,000 to 100,000 lb. per sq. in., the effect of the very rapid cooling is not negligible but it can be controlled. There is a moderate increase in hardness, which in itself is not a matter of very grave concern, particularly in butt welds. However, internal stresses are produced in welding these very high-yield, high-ultimate strength steels, and it is common practice and sound engineering to stress-relieve most structures built with these steels. The stress-relieving operation not only does what its name implies—relieves the stresses—but in addition is a true tempering or annealing treatment. Any increase in hardness that may have resulted during the welding is reduced to practically the initial level by this treatment. Because this stress-relieving is desirable and considered necessary by the profession, we cannot call these steels foolproof from the welding standpoint. They must be handled intelligently.

Corrosion Resistance and Heat-Treatment

So much has been said about the corrosion resistance of the new steels that no discussion can pretend to be complete without a word on this subject. It seems to be fairly well established that copper, phosphorus, silicon, and chromium—either alone or in combination—increase resistance to corrosion under some conditions, and under many conditions this increase may be of a very appreciable order of magnitude depending on the quantity and combination of the above-mentioned elements and the specific corroding conditions.

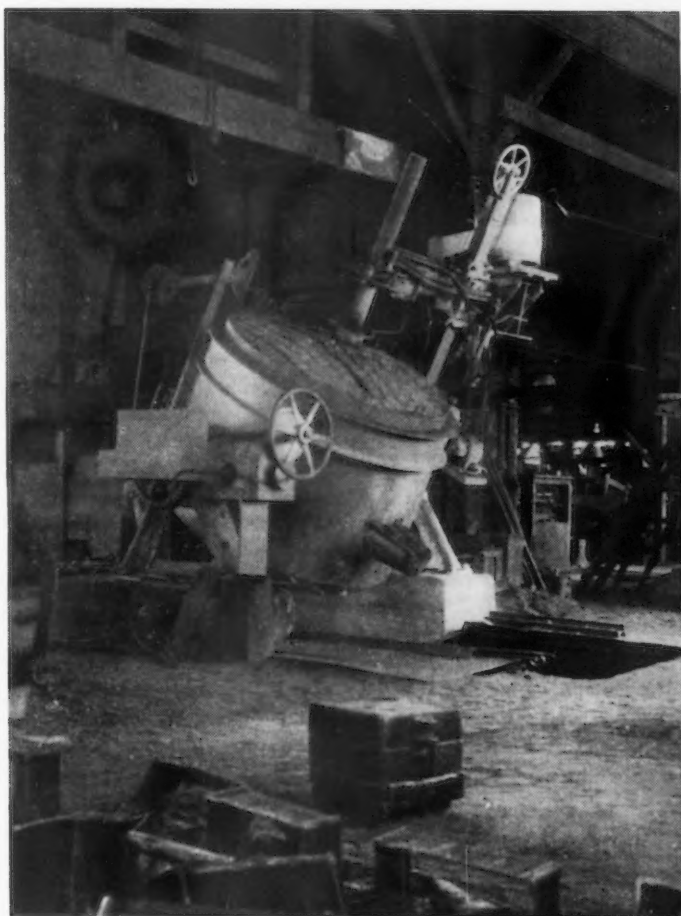
Copper has been added to these steels primarily for corrosion resistance. Copper also gives an increase in strength and the mechanism of this increase is probably the well-known precipitation hardening. The effect can be induced to a very much greater degree by a special heat-treatment. Due to the presence of about 1 per cent copper in the as-rolled condition, an increase of some 5000 lb. per sq. in. is noted. If a special heat-treatment is applied, which consists of both normalizing and drawing, as much as 20,000 lb. per sq. in. increase may result. Whether this may be achieved without a disproportionate loss of ductility is a controversial question. Moreover, it is a rather academic question for

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SINCE Siemens first experimented with his crucible electric furnace in 1878, there have been over 30 different types of furnaces devised for making steel from a metallic charge. One of these is the Greene unit shown here. In this article, Mr. Greene does not discuss furnaces but does advance a number of interesting observations concerning steel deoxidation. By deoxidizing during slow melting prior to alloy additions and by controlling the slag, a better steel is obtained.

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Deoxidation of Electric Steel

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By ALBERT E. GREENE

Manager of Greene Electric Furnace Co., Seattle, Wash.

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THOROUGH deoxidation of electrically melted steel saves money in various ways.

Many properties of steel depend on the extent of deoxidation. Soundness is one such property; ductility is another; response to heat treatment another; resistance to oxidiz-

ing influences while molten is another, and resistance to rusting after solidification is still another. Inasmuch as steel with these advantageous properties is becoming more readily available, it is increasingly necessary for other melters to make steel of this better quality in order to compete. However, it is not essential to have large melting furnaces attain this end. The simplicity of making this better steel is such that the use of small furnaces and slower melting is rapidly increasing.

The particular phase of steel treatment under consideration in

this article is the process by which more thorough deoxidation is accomplished, and particularly when deoxidation is accomplished prior to alloy or aluminum additions to the steel in the furnace. Little, if anything, has been published, as far as is known, about deoxidation of steel prior to and without alloy and aluminum additions, yet the results of this procedure are such as justify careful consideration. In fact, some makers believe the better steel is made in this way. The process is something more than ordinary deoxidation.

Deoxidation, as ordinarily con-

sidered in steel making, is said to be based on the formation in the molten metal of insoluble oxides by the addition to the molten steel, either in the furnace or ladle, of metallic elements that have greater affinity for oxygen than iron has, and they thus take oxygen away from the iron oxide which is dissolved in the steel. The insoluble oxide which results may remain largely in the steel or it may float up into the slag, or both. The elements ordinarily used for this purpose are manganese, silicon and aluminum. The amount of insoluble oxide remaining in the steel after solidification affects the properties of the steel. The dissolved oxide remaining in the steel after solidification also influences the properties of the steel. If there is enough dissolved oxide in the steel while molten which remains after solidification, holes are likely to be found in the solidified steel.

Avoid Insufficient Deoxidation

When steel is "killed" without sufficiently deoxidizing it, the quality of the finished steel is uncertain and the insurance of soundness is not what it could be. Holes result from the reaction between the dissolved oxygen and the dissolved carbon and this reaction takes place after solidification of the outer part of the casting has begun. When steel of this kind is subjected to influences like those in a green sand mold, holes appear to result which are not sufficient to give signs of wildness in the heads of the castings. Addition of an alloy element may even prevent formation of these holes yet without combining with sufficient oxygen to avoid detrimental effects. Thus, steel can be "killed" so to speak by combination of oxygen with an alloy element without getting the resulting insoluble oxide out of the steel, and this remaining insoluble oxide affects the quality of the steel. But the remaining dissolved oxide also affects the quality of the resulting steel. With more complete removal of oxygen, both soluble and insoluble, a better quality of steel results, and this kind of steel and the method of making it justify continued study.

The article by B. L. McCarthy in *THE IRON AGE*, Oct. 10, 1935, says: "... the amount of iron oxide removed by deoxidation is relative, and the fact that the steel

lies quiet in the mold does not indicate complete deoxidation." This statement is in agreement with the writer's experience. A test bar poured from an electric furnace heat of steel into a chill mold appeared sound and quiet on its top surface and even inside. However, a test bar poured from the same molten steel at the same time into a vertical green sand mold had holes inside it; these holes did not extend through the outer surface. The steel was apparently not sufficiently deoxidized to resist the influences met with after it entered the green sand mold. Yet the top of the test bar cast in the sand mold did not show signs of wildness. It did not "dome" up but the holes were apparent when the bar was sawed in two. These holes were internal and did not extend through to the outside.

With wet sand it is possible to have holes from the outside extend into the steel, and the remarkable fact is that when the steel is sufficiently deoxidized even this extra wetness and gas is not sufficient to cause wildness or formation of internal holes not connected with those extending in from the outside. When deoxidation was carried further, then the sand cast test bar no longer showed internal holes and the physical properties of this more thoroughly deoxidized steel are materially different and improved. This improvement results from the proper deoxidation treatment.

This deoxidation, which in general is such as will give sound test bars cast in green sand molds prior to alloy or aluminum additions, can be had by a simple melting and slag deoxidation treatment during melting. This is not to say that no alloy additions are subsequently made, for they usually are. However, the efficiency of the alloy metal addition is increased by this method, where the steel is more thoroughly deoxidized, than is possible or likely with more rapid melting and killing treatment. Less of the alloy element is used up in combining with oxygen which ought not to be there. Much of the manganese used in steel making is used up in getting rid of oxygen.

Steel Killed by Alloys

The expression has frequently been heard that electric steel is

"touchy" or "on the edge" or "goes wild easily." Partially deoxidized steel, especially when melted more rapidly and killed with alloy additions, is more likely to turn wild after leaving the furnace and result in sponginess in the castings than steel which is more thoroughly deoxidized. The fact that a test bar cast in green sand can be spongy, whereas a chill test bar of the same steel may not show sponginess, is evidence that the slight influence of the green sand is sufficient to cause the trouble. Steel can be "well killed," so to speak, by alloys, and even certain alloys can be added to improve ductility. Yet the steel may retain certain ill effects of insufficient deoxidation.

Rapid "killing" does not allow time for the insoluble oxides to leave the steel and enter the slag. But deoxidation which makes possible a sound test bar cast in green sand prior to alloy or aluminum additions gives a steel in which these insoluble oxides are not present to the same extent. This latter kind of steel does not appear to have those properties referred to as "touchy" or "on the edge" or "easy to go wild," even when subjected to unusual oxidizing influences during handling while molten.

In the above-mentioned article by McCarthy the statement is made that "the term 'killed steel' is often too closely associated with deoxidation." He further says that the degree of killing is usually indicated by the silicon content of the metal, but also mentions that the degree of killing can vary considerably in steels of the same silicon content, the high carbon steels being more thoroughly deoxidized due to a lower oxide content prior to deoxidation. His conclusion apparently is that the extent of final deoxidation depends on the amount of oxides in the metal prior to deoxidation. Also, although his article deals primarily with grain control, yet his findings check with those of the writer that the best steel is that from which the dissolved oxide has been removed to the greatest extent, i.e., steel having the lowest possible content of dissolved oxide. The article by McQuaid in *THE IRON AGE* of Oct. 17, 1935, indicates similar conclusions when he says in effect as follows: Why does fine grain scrap show

marked tendency to produce fine grained steel when dead-melted in the electric furnace without aluminum or with very small aluminum additions, whereas the simple act of "boiling down" a heat of fine grain scrap eliminates this fine grain tendency? Boiling, of course, results in more oxidation prior to the killing treatment.

Experience indicates that "boiled" steel, notwithstanding deoxidation treatment while molten, is never as good after solidification as steel which is never subjected to such oxidation treatment or to any oxidation treatment while molten. In other words, "boiled" steel is never as good as steel melted without oxidation and thoroughly deoxidized. For example, consider steel melted in an electric furnace and deoxidized prior to the addition of alloy metals or aluminum to the extent that a quiet sample is obtained by pouring a test bar in a green sand mold. This steel appears substantially better than steel which requires alloy and aluminum additions just before pouring in order to get a quiet sample. There are numerous advantages of this more thoroughly deoxidized steel, not only economies in alloy additions, and economies in avoiding loss from spongy castings, but also in better response to heat treatment. The resulting metal has increased ductility and rust resisting properties are apparently better.

Deoxidation Prior to Alloy Additions

This method, which ordinarily gives a sound test bar prior to alloy or aluminum additions, is a modification of the Greene slag process and is used in numerous Greene electric melting furnaces. Removal of oxygen from the steel is relative, and "killing" treatment can be so applied as to prevent the steel coming back in the mold more or less of the time. In other words, it is possible to melt more rapidly and kill sufficiently to avoid trouble most of the time. However, the evidence now indicates that fast melting, quick killing and dumping of the heat does not give the insurance of sound and high-grade castings that can be had with more thorough removal of oxygen prior to alloy additions. Apparently the best results are had by deoxidation during slower melting rather than

by faster melting. Just where is the dividing line has not been definitely proven, but it appears certain that when more rapid melting is resorted to, it is not so easy to obtain a quiet sample prior to alloy additions.

Slag Control Important Factor

Slag control is a primary factor in this method of more thorough deoxidation. This control should begin early in the heat so that the work will be done or largely so by the time the first sample is taken. Avoidance of oxidizing or boiling influences necessitates the selection of scrap suitably free from phosphorus and sulphur so that no oxidizing slag treatment is necessary to remove phosphorus. The method can be used in either acid hearth or basic hearth furnaces. The slag additions depend, of course, on the nature of the hearth, basic or acid. These additions are such as will form a fluid and quick-melting slag to cover the steel bath as rapidly as possible before any large amount of the scrap has melted. In an acid (silica) lined hearth, the slag additions may, for example, comprise equal parts of silica sand and crushed limestone, aiming to secure a slag with about 30 per cent CaO when melted and reduced. Reduction of the iron oxide is accomplished preferably by fine carbon or coke. Acid slags are common with less than 1.5 to 2 per cent of FeO. Application of carbon is so as to avoid undue carburizing of the metal.

A slag bath is formed which collects the iron oxide from the scrap during melting and this oxide is rapidly reduced under these conditions. The ease of getting a quiet first sample depends on the conditions; very low carbon makes it somewhat harder, and so does faster melting. Nevertheless, it is true that with less dissolved oxide present, there is less tendency to have insoluble oxides and more thoroughly deoxidized steel can be had by this method. Where faster melting is used, the use of lime may be preferred to limestone. If sufficient deoxidation is not had to permit a quiet sample on the first test, small additions of manganese and silicon can be made to the bath, or silico-manganese, all of which may go to the slag. When the additions are made early in the heat, deoxidation is speeded up in this manner.

Ferrosilicon can be used as a reducing agent, but usually only in basic hearth furnaces. With sufficient time and reduction of the slag, a quiet first sample is ordinarily possible. The slag composition can then be adjusted to suit the operator's preference for the method of final slag control at the end of the heat. For instance, it can be less fluid and more siliceous if desired. In basic hearth melting the proportions of sand and lime are reversed in order to obtain a slag with about 25 to 35 per cent silica with lime preferably as much as 50 per cent in the reduced slag. A quiet first sample in this method is also common. Then the final slag in the basic hearth can be adjusted as desired. It is the low melting slag which collects the iron oxide more readily and from which it can be more rapidly reduced. The appearance of the first slag is often a transparent green color, in either acid or basic operation, changing to opaque on addition of alloy metals, but usually light colored and solid. Needless to say, no aluminum is used in the test molds when pouring samples to test the degree of deoxidation. Once deoxidized to the desired extent, the steel can be further treated as desired, alloyed or super-heated. This method appears to give much better steel than can be had by more rapid melting and quick killing by alloy additions.

Increased Resistance to Rusting

One further and interesting characteristic of this more thoroughly deoxidized steel is its apparent increased resistance to rusting. The evidence, although preliminary and incomplete, nevertheless indicates a marked difference in this respect between samples with more and with less dissolved oxide. It is reasonable to expect that steel with more dissolved oxide will rust more rapidly than steel with less, and this appears to be true. The advantages of this better steel are numerous and deserving of further study. One very simple demonstration of the advantage resulting from avoidance of spongy castings is to figure the cost of just one casting lost by reason of holes. For instance, consider that it is a 40-lb. casting which sells for 16c. per lb.; it is worth \$6.40. The saving of just one such casting out of a whole heat is worth much more than the time and cost of better deoxidation.

Open-Hearth Group Plans Formation Of Regional Sections

ering the entire subject in a very detailed manner.

Furnace Construction

The first speaker, W. C. Buell, consulting engineer, brought up the question as to whether or not a shallow or deep bath is the most economical in furnace operation. The speaker defined a depth of metal 35 in. or less as a shallow bath, and anything greater a deep bath. Figures were given showing a group of furnaces with shallow depths producing steel within a range of 16.8 to 24.3 tons per 1000 sq. ft. of bath area per hr. Another group with a deep bath produced at from 22.6 to 29 tons per hr., or 25 per cent faster than the first of shallow bath group. However, continued the speaker, volumetric production rate of bath showed on comparison that the shallow bath furnaces worked faster with a volume production rate of 59.6 to 70.1 cu. ft. of bath to produce one ton of steel against 57.4 to 88.5 cu. ft. of bath volume for the deep bath group. This data, according to Mr. Buell, demonstrates that a shallow bath refines more rapidly, and thus quality is better when produced in a shallow bath unless refining time is greatly increased.

During the discussion on this paper one member felt that in the higher carbon steels it was much better to have a deep bath, because it took more time and in this way gave the heat a better working with less oxidation. It was generally understood that Mr. Buell was referring to the melting of low carbon or rim steel.

Change in Furnace Design

Design and layout of the open-hearth furnace was covered in another paper which stressed changes made during the past few years, enabling an increase in output per hr. The speaker pointed out that it is customary to rate furnaces on the basis of 5.5 sq. ft. of hearth area per ton capacity. This gives

a maximum depth of bath of about 28 in. at the center of the furnace. By carrying a slightly deeper bath the furnace can be over-charged with considerable increase in output per hr. According to the speaker, in some cases, furnaces are overcharged about 15 per cent, but the extra tonnage is produced at a faster rate than is possible by charging only to the rated capacity.

Emil Vierow, speaking on a new development in open-hearth furnaces, said that in accordance with conventional open-hearth furnace construction and operation, if the ports, passages, regenerators and valves were designed for an increased flow of fuel and air during the melting down period, they would be much too large for the normal flow and operation would be inefficient and uneconomical. The speaker described in detail a new development in open-hearth furnace construction and operation which he thought might offer a practical solution of the problem mentioned above.

The structural improvement consists of a combined fuel and air burner port provided at each end of the furnace chambers. In addition auxiliary outlets are provided at each end of the furnace chamber interiorly disposed to the burner ports. He pointed out that the auxiliary outlets have no connection with the burner ports or other corresponding regenerators. In accordance with the new methods of furnace operation, products of combustion are conducted from the furnace chamber through the burner ports at a predetermined limiting rate. Under the new method, when fuel is burning above the set amount, a switch changes the pressure controller action so that it maintains the desired pressure condition in the furnace finally resulting in all waste gases above the described set amount passing from the furnace chamber through the auxiliary ports and flues.

Another construction and opera-

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WITH an attendance greater than any since its organization, the nineteenth conference of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers took place at Detroit, April 16 and 17. As is the custom with this body of practical open-hearth men, lively and informative discussions took place. Before presentations of the papers and discussions, it was stated that additional companies were represented this year.

In a report of the executive committee it was announced that members who had attended previous conferences and who were accepted as members of the Institute could have the registration fees paid by them applied against the initiation fee. Another new feature was the passing of a resolution covering the formation of local sections to carry out the work of the open-hearth committee. These sections will be located at Cincinnati, St. Louis, Cleveland, Pittsburgh, Philadelphia and Youngstown. They will be organized before fall and it is hoped that interested parties will join in the meetings so that questions may be developed to be answered at the yearly open-hearth committee conference.

It was decided that next year's open-hearth committee meeting will be held at Birmingham, with a three-day session in April. The committee plans to send out a questionnaire on fuel consumption cov-

tion method, involving a new angle, was described which was very similar to the one briefly covered above. The speaker estimated that improvement in performance of a 150-ton furnace built along the lines recommended by him, compared with the best modern convention practice, could be tabulated as follows: Increased rate of production, 14 per cent; increased yield of product, plus 1 per cent; increased chamber life, 14 per cent; increased downtake, fan tail and regenerator life, 50 per cent.

Another speaker covered movable ports, in which mixed gas, that is $2\frac{1}{2}$ parts of blast furnace to one part of coke oven gas, is used. The results obtained by the company represented by the speaker showed that mixed gas plus a movable port cut down the cost of making steel considerably.

Checker Construction Covered

Checker construction was discussed by George Danforth, and he stated that the more important features to incorporate in checker work design, in order to obtain the best over-all results in the regenerative chambers, are the following:

- (1) Total mass of brick work for maximum heat storage.
- (2) Maximum brick surface is exposed to the flow of gases as to ultimately absorb the greatest possible amount of heat from the hot waste gas and to correspondingly heat the comparatively cold incoming gases.
- (3) Passageways throughout the checker work necessary for sufficiently free flow of gases, yet so arranged that the gases properly contact the exposed surface of all the brick mass provided.
- (4) Reasonable cost of maintenance.

The speaker felt that the general practice of using $10\frac{1}{2} \times 4\frac{1}{2} \times 4\frac{1}{2}$ checker block was unwise, because the center portion of the $4\frac{1}{2}$ square checker block is not only a dead loss, but is a detriment to the surface portion. He thought the same might be said in some degree of any checker brick thicker than $2\frac{1}{2}$ in. In the practice set up by him, the $10\frac{1}{2} \times 4\frac{1}{2} \times 4\frac{1}{2}$ checker blocks were replaced by a standard $9 \times 4\frac{1}{2} \times 2\frac{1}{2}$ laid on the $4\frac{1}{2}$ sides, with ends $1\frac{1}{2}$ in. apart and, therefore, on $10\frac{1}{2}$ centers. Individual brick was increased 80 per cent and a much greater surface was exposed. According to Mr. Danforth, his method carried out in a steel plant resulted in a $16\frac{1}{2}$ per cent increase in production with a $10\frac{1}{2}$ per cent decrease in melting expense, a longer furnace life, and 7 per cent in total cost above net metal. The speaker, in conjunction with his as-

sociates, devised the Danforth Peterson checker work, which can be used with improved results either in a single pass or multiple pass regenerator. This checker work is the result of years of experience with the method described above. Advantages are stability of structure, large free area, wells for flow of gases, with more than the usual amount of brick mass and exposed surfaces for the desired heat storage and transfer.

A discussion occurred at this point concerning the use of sloping back walls versus composition straight walls. Various figures were given by members showing the savings per ton ranging from 4c. to 10c. by using the sloping walls. Use of sloping walls tends to increase the life due to the fact that the heat is not so intense as is the case with straight walls. One member said that in his plant the use of sloping walls cut down tremendously the time spent in patching. It seemed to be the consensus of opinion that where practiced the sloping wall was desired from the cost standpoint.

Copper Stools for Ingots

An interesting discussion of copper stools for ingots was presented by H. B. Kinnear. According to Mr. Kinnear, during 1935 tonnage of copper used for stools has increased about 350,000 lb. making a total of 775,000 lb. now in use for that purpose. Copper inserts have accounted for an increase during this time of 180,000 lb., or over 350 per cent, to a total of 230,000 lb., making a grand total of copper being used for stools and inserts slightly over 1,000,000 lb. A test which the speaker ran showed that mold life was increased 125 per cent when a copper stool was used. At first, there was a tendency toward cracks, but with improved refining of copper, although the stools still have a tendency toward fire breaking after 125 to 150 heats, the deep cracks are no longer encountered. Current improvements have been made with the idea of cutting down the possibility of cracks, and the results have been encouraging. A stool made of laminated copper recently in service showed no signs of cracks after 125 heats. As far as cost is concerned, after the copper stool has been used for a sufficient number of heats to cancel the first cost, at the cast iron stool rate of 5c. per ton, the total savings from the use of copper stools amounts to 10.3c. per ton of ingots—5.3c. for increased mold life and 5c. for iron stool cost—and after deducting 2.3c. per ton as an interest charge on stool investment, the saving stands at around 8c. per ton of ingots produced.

In case the scrapped copper stool is used as an addition it takes about 300 to 310 heats to wipe out the first cost of the stool, and if it is returned to the refinery about 730 heats are required, due to the cost of freight, etc.

A short discussion followed this paper, in which it was brought out that high carbon heats have a tendency to wash or burn the copper stools. Some of the men present said they were using copper stools and getting good results.

Corrugated vs. Plain Molds

A lively discussion concerning the value of corrugated versus plain molds ensued. Several members seemed to think that less cracks resulted from the use of corrugated molds. On the other hand, quite a few disagreed with this, and felt that it did not make much difference whether a corrugated or plain mold was used. There seemed to be unanimity that in the making of large ingots the use of corrugated molds tended to cut down the number of cracks more than the use of plain molds. One member claimed that the use of corrugated molds in some cases cut down inspection costs 50 per cent. However, there were quite a few men who felt that the cracks appeared, regardless of which type mold was used.

Heating Molds Where Frequent Changes Must Be Made

A lengthy discussion on the heating of molds before usage brought out the fact that in some plants mold houses have been built where the molds are kept dry and heated, thus cutting down chipping costs to such an extent that the investment was justified. Some plants put new molds between two hot molds, and others place a hot ingot on top of molds. Still other companies use a gas line into each mold, and in this way heat them up. Discussion of the proper temperature seemed to place the ideal one at 100 to 125 deg. F., and it was agreed that a mold too hot would result in just as bad an ingot as one too cold. Representatives of some companies made the statement that they took the molds as they came without heating them, but did endeavor to keep them dry. One steel plant favored the practice of oiling its molds.

Effects of Size of Molds on Rimming Qualities of Steel

A discussion on the effects of size of molds on rimming steel brought out that as the mold size increased difficulties were decreased. Many members were of the opinion that the height of the mold was a very important factor. Although there

was no general agreement on the actual size mold to be used with the best results, a width of at least 25 to 30 in., regardless of whether the mold was rectangular or square, seemed to be the most mentioned figure. In talking about rimming steel, the discussion developed that pouring temperatures were very important, that the heat should not be poured too fast, and that splashes should be entirely eliminated.

New Type of Steel Cinder Pot

A paper discussing in detail a new type steel cinder pot was presented by William Johnston, Jr. Mr. Johnston described a steel cast cinder pot which was corrugated to take care of stresses due to the outer versus the inner temperatures. The use of this corrugated steel cinder pot seemed to improve the life anywhere from 6 to 15 months over the standard cast iron type. Although most of the steel cast cinder pots now in use are in blast furnace departments, there have been a few put in use in open-hearth departments, and good results have been obtained.

Refractories

A complete summary of the various refractories used in the many parts of open-hearth furnaces was given by John D. Sullivan, of the Battelle Memorial Institute, Columbus, Ohio, covering the improvements and latest experience obtained in the use of refractories. Among some of the items mentioned was the fact that in front and back wall construction, the tendency is to replace silica brick with basic or neutral brick, resulting in a great increase in life. The speaker felt there was a crying need for a good ladle brick, as the present bricks do not give as long a life as he thought they should.

Talking on insulation of open-hearth furnaces, E. F. Cone discussed the results of the questionnaire sent to steel companies and foundries operating open-hearth furnaces, asking for confidential replies covering the use of insulation. According to the speaker, the answers from 30 steel ingot and casting makers showed that insulation practices were by no means uniform. Some apply it to checkers, others to checkers and other parts, except the roof. No small number use insulation on the entire foundation. Best results seemed to be obtained when insulation is extensive, although there are beneficial results in all cases. Some of the results reported by the companies showed increases in the life of furnaces of from 20 per cent to 30 per cent, and from 10 per cent

to 15 per cent in the life of the back wall, while in other cases cost of refractories was cut in half. Fuel savings ranged from 10 to 30 per cent, and six plants very definitely stated fuel savings were at least 10 per cent. Mr. Cone thinks that insulation has come to stay and that in a few years furnaces not insulated will be an exception rather than the rule.

After the presentation of this paper a general discussion concerning loose insulation vs. preformed brick brought out that the salvage value of loose insulation was 70 per cent, while salvage value of preformed brick was 25 per cent. Most of the men speaking during this discussion used loose insulation.

Operations

Temperature control of open-hearth metal was covered by a discussion of the four methods used, namely: Thermocouples, radiative pyrometers, optical pyrometers, and the indirect methods. The speaker stated incidentally that results of indirect methods, such as melters and open hearth men used, were uncanny in their proximity to the actual temperatures. Another speaker described the optomatic pyrometer, the principle of the operation of which involves the use of the photo-electric cell. The operation of this pyrometer is very quick, and the main mechanical feature is the variation of a filament lamp which has been calibrated to actual temperatures, and readings obtained are very accurate.

Another speaker described thermocouples, and seemed to think that good results have been and can be obtained by their use. Citing as an example the fact that temperatures taken in a mixer showed that the temperature dropped in the iron due to air coming in the hole when the iron was tapped which chilled the wall, which in turn chilled the iron. This sudden drop in temperature resulted in a 0.4 per cent loss in carbon as kish. Extensive use of the thermocouple, according to the speaker, is made in the open-hearth in the back walls, and with proper heat control, proper temperatures can be determined which will cut down the amount of skulls resulting from cold heats.

A brief paper was presented on basket pouring, in which plate steel lined with fire brick with a nozzle at each end of the bottom, and the center of the box slightly concave to hold the pool of metal in order to prevent splashing, constituted the main features of the basket pouring experiment. The company represented by the speaker tried basket pouring out about 16 years

ago, but abandoned it and just recently tried it at another time and found that in many cases flaws are eliminated and chipping costs are cut. While basket pouring for certain grades of steel is all right, not all grades can be poured with this method. With low carbon alloy or fine grain steels they seem to be good with this method.

The benefits of a magnesite nozzle in preference to the clay nozzle, were discussed and it was brought out that the magnesite nozzle is originally $\frac{1}{4}$ in. larger than the clay nozzle, but because of the expansion of the outer surface and the contraction of the inner part, the hole becomes smaller thus making the diameter practically the same as that of the clay nozzle. The use of a magnesite nozzle was found to be ideal in high manganese steel running from 1.35 to 1.65, with no erosion encountered. The bell should be saucer-shaped and not of the deep bell type. A screw type stopper head with a boss on it to carry the load of the sleeve thus relieving the head of carrying any load other than its own weight, was used.

A discussion among the various members showed that some were using the magnesite nozzle, while others had used it and had discontinued it. One of the beneficial results reported was less skulling. The experience of one company which discontinued using the magnesite nozzle was that there was a light drip. It was also stated that using this type nozzle the steel should be poured slightly hotter than the usual practice.

Quality Problems

J. D. Sullivan presented a detailed paper on residual metals in open-hearth steel. This study has been going on for several years, various companies sending samples of the bath to the Battelle Memorial Institute for analyzation. Using the average of all plants by tonnage capacity showed nickel and chromium remaining constant during the past year, with a slight increase in tin, a decrease of two points in manganese, and an appreciable drop in copper. The average by plants shows an increase of one point in manganese, a slight increase in tin, a noticeable increase in chromium, a noticeable decrease in nickel, and an appreciable drop in copper. The average by tonnage capacity of the ten plants that have cooperated in all nine periods shows manganese remaining constant, a slight increase in tin and chromium, a slight drop in nickel, and an appreciable drop in copper.

One of the things that seemed to engage the attention of the delegates was the fact that residual

copper has dropped over the past year, while in 1934 it had shown an increase over 1933. The speaker felt that the slight but persistent increase in tin and the drop in nickel were worthy of mention. Mr. Sullivan told the members that his Institute would be very glad to receive additional tests from companies not having sent them before, as there seems to be quite a lot of interest among steel plants in the tabulations showing various changes in percentages of residual metals in open-hearth steel.

Antimony In Scrap

Following this talk a discussion of antimony found in scrap was presented. During 1935 a steel company noticed yellow fumes coming from the molds in some low carbon steel. When the billets were made they could not be rolled. An immediate investigation was made to find out if something had been wrong with the cast iron scrap. The same action occurred in two more heats, making a total of three that could scarcely be rolled. Chemical tests ran on the heat showed:

	Sulphur	Antimony	Tin	Arsenic
Worst heat .085	.86	.028	.045	
Next worst .063	.49	.033	.035	
Next worst .034	.15	...	.018	

A chemical analysis of the iron scrap used in the heat tabulated on the same basis showed:

	Sulphur	Antimony	Tin	Arsenic	Lead
4.65	32.52	1.05	1.55	5.49	
4.65	32.38	...	1.18	...	
4.65	24.17	...	.79	4.05	

The fourth heat, which showed traces of antimony approximating 0.030 could be rolled. It was found upon investigation that in some scrap iron that had been purchased there were small buttons of material having the appearance of iron and a gray fracture, but being in reality mostly antimony. Apparently this material had been mixed in with cast iron scrap and shipped into the steel plant. The experience was so costly that the company is going to great lengths to prevent a recurrence. A discussion by many of the members brought out the fact that every effort is made to keep bearing metals from being mixed in with scrap, and many companies pay bonuses for all of such metal that is segregated.

Closely connected with this was a discussion on No. 2 scrap. Again the problem of keeping bearing metals out of the scrap was thoroughly discussed. Some companies have embarked on an education program with the scrap dealers, with the result that they are getting good cooperation. Other plants have one man whose duty it is to look for this type of contamination. Still others reserve the right to

reject material in which amounts of injurious elements are found.

A debate ensued on the possible detrimental effects of copper in the bath due to its appearance in the materials charged into the furnace. While some members did not seem to think that copper even as high as 0.20 per cent would be bad, still others felt that 0.10 per cent was high enough and that copper should be kept under this range.

One of the things developed was that in some cases too much copper in the steel gives an appearance of burning to the shapes, when in reality they are not burnt at all and the color comes from the segregation of the copper.

Remarks concerning sulphur in free-cutting steels seemed to in-

dicate that the best practice on the part of one company was elimination of silicon entirely, and the holding down to a minimum of requirements of aluminum additions. Another representative of a steel company seemed to feel that good machineability in free cutting steel was more or less of a hit-and-miss proposition, while another member felt that a better selectivity of heats on the basis of the use to which the material is to be put would help a lot toward the problem of free-cutting steels.

One delegate stated that the type of tool, how it was ground and the speed of machines were often the cause of good or bad machineability in the steel rather than the sulphur content or the open-hearth practice.

Warehouse Group to Meet During June

THE twenty-seventh annual convention of the American Steel Warehouse Association, Inc., will be held at Edgewater Beach Hotel, Chicago, June 10, 11 and 12, according to W. S. Doxsey, executive secretary, 442 Terminal Tower, Cleveland.

Addresses by outstanding executives of the steel industry, in addition to discussions of steel warehouse problems, will feature this year's program. The third day of the convention will be devoted to inspection trips to steel plants and steel warehouses in the Chicago district.

Elections of officers by several chapters of the association as follows have been held.

The Connecticut chapter has chosen the following: R. B. Shearer, C. S. Mersick & Co., New Haven, Conn., president; H. L. Stone, Hunter & Havens, Inc., Bridgeport, Conn., vice-president; and G. S. Brouso, C. S. Mersick & Co., New Haven, Conn., secretary-treasurer.

The Central States chapter at a recent meeting named as its president, A. Y. Sawyer, Joseph T. Ryerson & Son, Inc., Chicago; as vice-presidents, W. J. Holliday, W. J. Holliday & Co., Hammond, Ind., and A. C. Cox, A. M. Castle & Co., Chicago. E. G. Fisher, National Steel Co., Chicago, was elected treasurer and Carl Channon, Great Lakes Supply Corp., Chicago, secretary.

At the meeting of the Northern Ohio chapter held on April 13, Fred S. Doran, Joseph T. Ryerson & Son, Inc., Cleveland, was chosen president; H. H. Kuhn, Hardware & Supply Co., Akron, vice-president; and Roy Stofer, Paterson-Leitch Co., Cleveland, secretary.

At Boston George R. Beasom, Scully Steel Products Co., was re-elected president of the New England chapter. Other officers elected were: Carroll S. Harvey, Arthur C. Harvey Co., first vice-president; Paul Avery, Avery & Saul Co., second vice-president; J. L. Parsons, Edgar T. Ward's Sons Co., secretary-treasurer; Richmond Lewis, Charles C. Lewis Co., national director.

The Baltimore chapter elected as president John Stewart McKenzie, John McKenzie & Co., Inc.; Eugene Mowlds, Scully Steel Products Co., secretary; George J. Parke, Eagles-ton-Parke, Inc., Norfolk, national director.

In the first two months of 1936 Fenestra steel window sales throughout the country increased 65 per cent over the same period in 1935, according to C. R. Raquet, vice-president, Detroit Steel Products Co., Detroit, maker of the product. This increase has been particularly noteworthy as severely cold weather practically suspended building activities for about half of this period. The Fenestra line now includes 100 different steel window designs, offering full scope to the imagination of the architect in connection with any type of home design, conventional or modern.

Bethlehem Introduces New Process For Electrolytic Coating of Steel Wire with Zinc

REPRESENTATIVES of farm papers, metallurgists and technical and business paper editors from all parts of the country attended the formal opening, April 16, of the Bethlehem Steel Co.'s new mill for the manufacture of Bethanized wire and fence at Johnstown, Pa.

The installation marks the introduction of a new process for the zinc coating of steel wire by the electrolytic process and is believed by the company to be an important contribution by the steel industry to agriculture. Representatives of farm publications and associations attending the mill opening were generally of the opinion that the Bethanizing process offered the farmer reduced fencing costs through a product assured of a long life, and displayed great interest in the development.

The Johnstown Bethanizing installation is the culmination of experimental work which has been carried on recently at the Sparrow's Point, Md., plant of the Bethlehem Steel Co., where a smaller Bethanizing unit has been in operation for some time. In discussing the process, U. C. Tainton, president, Tainton Metallurgical Corp., Baltimore, who has been consultant to the Bethlehem company in the development of Bethanizing, stated that zinc of a high degree of purity was first produced commercially in this country by the Sullivan Mining Co., Kellogg, Idaho, in 1928.

"As regards the factors which affect the purity of the metal," he explained, "the process employed in Bethanizing is exactly the same as that used at the Sullivan plant, the only difference being that the zinc is plated directly onto a steel surface instead of onto an aluminum cathode from which it can be

detached, and melted down into ingots."

Raw Materials Used

In describing the process, Mr. Tainton stated that the raw material used consists of roasted zinc concentrate carrying 50 to 60 per cent zinc and a long list of other elements which have a possible metallurgical or economic bearing on the operation of the process.

"In the first operation," Mr. Tainton went on, "the roasted zinc ore is agitated with the return electrolyte coming back from the cells in which the bulk of the zinc has been extracted. This solution carries about 250 grams per litre of free sulphuric acid. During the first stages of this operation most of the other elements pass partly or wholly into solution; exceptions are lead and gold, also silver if sufficient chloride is present. Silica dissolves to form silicic acid. Iron, which is present in the feed as zinc ferrite, forms ferric sulphate, and this is partially reduced to the ferrous form by unroasted sulphide, always present to some extent. The other metals also dissolve as sulphates.

"As the addition of the zinc-bearing material is continued, the acid strength falls, gradually approaching neutrality. Before this point is reached, however, two important matters must be taken care of. The first of these is to bring about the conversion of the silicic acid to gelatinous silica. This is accomplished by the addition of a small quantity of a fluoride (assuming that the material does not itself contain enough fluoride for this purpose). The second point is the complete oxidation of the iron to the ferrous form. This is effected by the addition of manganese dioxide, which goes into solu-

tion as manganous sulphate. As agitation is continued the gelatinous silica undergoes syneresis, the gel separating into two phases, one relatively concentrated, and the other quite dilute. It is important that there be present enough silica so that the concentrated gel particles have sufficient rigidity to retain their form in the subsequent filtering operation.

"It is frequently necessary to add soluble silica for this purpose. As the acid strength falls further, the ferric sulphate hydrolyzes and the iron is thus eventually removed from solution. This point is of greatest importance in connection with the successful operation of the process. The precipitated ferric hydrate happens to have strong adsorptive properties, particularly in regard to three elements which are very deleterious in the subsequent electro-deposition of zinc, namely, antimony, arsenic and germanium. To secure good deposits of zinc, germanium must be removed to limits far below possible detection by analysis. One part in 20,000,000 of germanium will give rise to serious trouble.

"The progress of the reaction is watched by means of thiocyanate test paper and the addition of ore is continued until the red color fades out, indicating the removal of the iron. This occurs at a pH around 3.5 at which zinc oxide is still soluble, thus insuring a high extraction of the zinc. The aluminum sulphate also hydrolyzes, but not completely, and part carries over to the next stage of the purification.

Purification

"The pulp is now ready for filtration, which is carried out in Burt type filters. Here the solution is separated from the residue which

now contains the iron and silica together with lead, gold, silver, antimony, arsenic, germanium, and some aluminum. Calcium, if present in amounts greater than the solution can carry, is also eliminated at this point. The clear solution is pumped to storage tanks, from which it is drawn to the purification agitators, where it is treated with finely divided zinc dust at about 75 deg. C. This precipitates the other elements below zinc in the electro-chemical series, namely, cadmium, copper, indium, gallium, thallium, tellurium. Nickel and cobalt, however, if present in any quantity, precipitate only partially, and it is necessary to add a small quantity of a tellurium compound in order to free the solution from these elements, which are decidedly obnoxious in zinc electrolysis.

"The precipitated metals are separated by filtration, great care being taken to prevent the presence of oxygen which would cause re-solution of the impurities. The resultant solution, consisting essentially of zinc sulphate, together with some amounts of sulphates of manganese, magnesium and calcium, is ready for electrolysis. Before being drawn down to the cells each lot of solution is tested in the laboratory to make sure that it meets the required standards for purity. The concentrated neutral solution, carrying about 220 grams per litre of zinc, is drawn down into the electrolyte circuit at a speed corresponding to the amount of zinc being taken out, so that the acid concentration of the electrolyte is maintained between 200 and 270 grams per litre.

Overvoltage

"One primary difficulty in obtaining a perfect coating of the pure zinc on steel arises from the fact that in depositing zinc from an acid solution we are, in a sense, going contrary to the laws of electrochemistry. When two dissimilar sorts of ions are present in a cathode layer the more electro-positive ones (that is, those lower in the electrochemical scale) are discharged first. Consequently, from an acid zinc sulphate solution which contains both zinc ions and hydrogen ions we should get at the cathode only hydrogen gas and no zinc. This, in fact, it is only too easy to do. The deposition of zinc is only possible because of the peculiar phenomenon of overvoltage, which is the name given to the property that certain materials have of opposing the evolution of hydrogen at their surface. Pure zinc has it in a high degree. Plati-

num black hardly at all. It is therefore easy to plate zinc onto a pure zinc surface from an acid solution, but impossible to do so onto platinum black. Iron is an intermediate case. The hydrogen overvoltage of iron is normally below the potential of zinc on the hydrogen scale. However, it arises with increasing current density and by sufficiently increasing this factor zinc may be deposited. However, if the surface is too rough, spongy or has certain foreign matter on it, it may be impossible to obtain a zinc deposit at any practicable current density. Hence this factor had to be considered in developing a satisfactory manufacturing process.

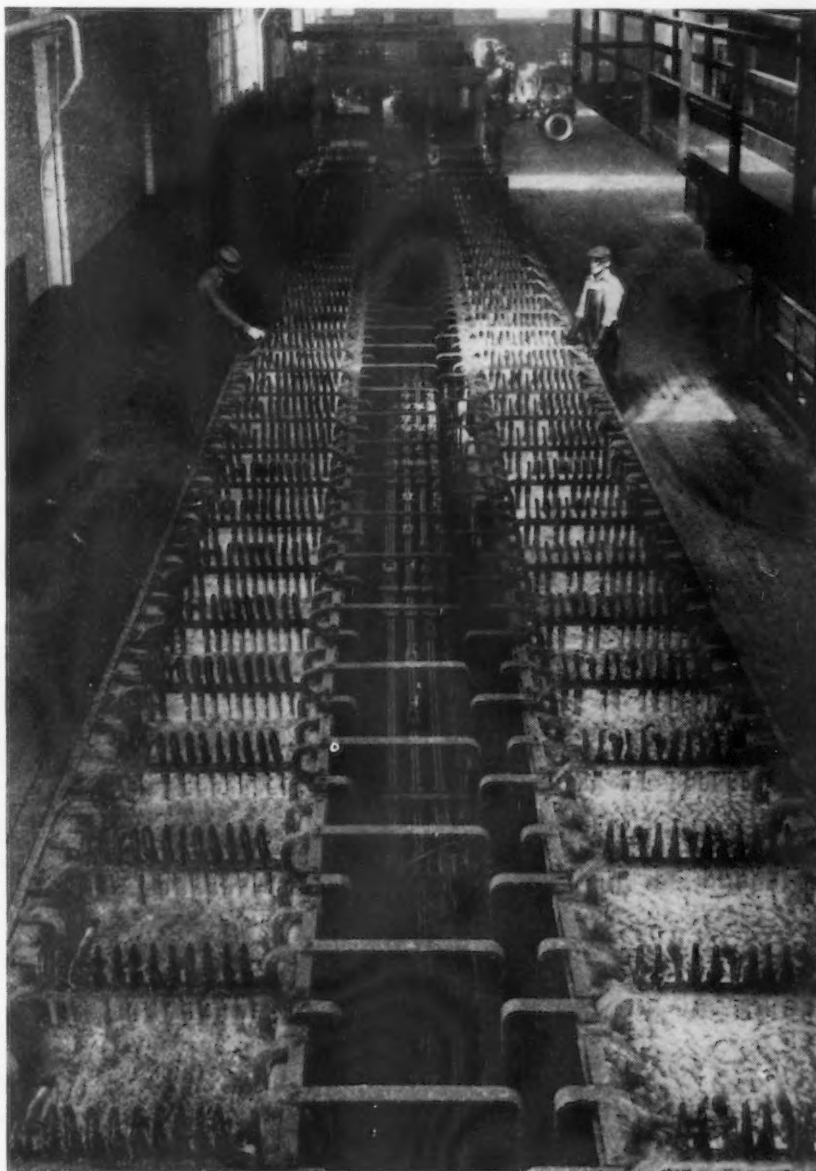
"Another difficulty arose in connection with the property that iron

has of adsorbing or occluding hydrogen. When hydrogen is evolved at an iron surface, as when steel is pickled in acid, hydrogen gas is occluded by the steel, causing embrittlement. Occluded hydrogen also interferes with the bond between an electrodeposited coating and the steel base.

Cleaning

"It is vitally necessary that the steel surface be free from all foreign matter such as grease, scale, rust and even spongy metal. It should not contain occluded hydrogen, and none should be introduced before the zinc comes down.

"To meet these conditions completely in the difficult case of wire,



BETHANIZING cells 100 ft. long in which 99.99 per cent pure zinc in solution is transferred to wire through electrolysis in heavy coatings. Bus bars deliver 40,000 amp. to the cells, thus insuring instantaneous coating and, therefore, tightest possible bond.

a new pickling method had to be developed. This was based on the fact that a strongly electro-negative element such as sodium would attack and combine with any non-metallic substances on the surface, but would not attack the metal itself. The method employed is to make the steel cathode in a fused salt such as sodium hydroxide. The nascent sodium evolved combines with such elements as oxygen, sulphur and phosphorus and produces actually a purer metal at the surface than in the body of the steel itself. All grease or organic matter is eliminated and no hydrogen is occluded."

Two Plating Cells at Johnstown

The new Bethanizing unit at Johnstown has two plating cells, each 110 ft. long and taking 40,000 amp. at normal load. There are normally twelve wires in each cell traveling at speeds of from 50 to 200 ft. per min., according to the thickness of coating and size of wire.

The electrolysis is carried out in the case of wire at current densities from 700 to 2000 amp. per sq. ft. This is from 20 to 50 times as high as the current density ordinarily employed in plating with soluble zinc anodes, and makes possible the employment of speeds as high as or higher than those of hot-dip galvanizing practice.

The anodes consist of an alloy of lead and silver which is far more resistant than lead alone, and accounts for the extremely small quantities of lead found in the finished product. During electrolysis the manganous sulphate is partially changed to permanganic acid,

and this reacts with the residual manganous sulphate to form a precipitate of hydrated manganese oxides.

The uncoated drawn wire coming from the reels passes first over counterweighed sheaves in order to provide a time margin for releasing any wires which may become tangled. Thence it goes to the fused caustic pots in which it is annealed and cleaned. These two pots provide a total length of about 40 ft.

After washing the wire goes to the plating cells. If necessary it may be given an anodic treatment in spent electrolyte from the zinc cells. Any sponge iron dissolved in this operation goes back to the leach plant where the dissolved ferrous or ferric sulphate is converted to zinc sulphate for return to the process.

After plating the wire has a matt or finely crystalline surface. In order to expose as small as possible an area to corrosion the wire is rendered smooth and bright by polishing or drawing.

Dies for Polishing

The Bethlehem staff, according to Mr. Tainton, developed two important features in this unit. The first is the 40,000-amp. homopolar generator set, a complete break-away from traditional electrolytic and plating practice. The success of this experiment is believed to be of the greatest importance to the future of electrolytic operations generally.

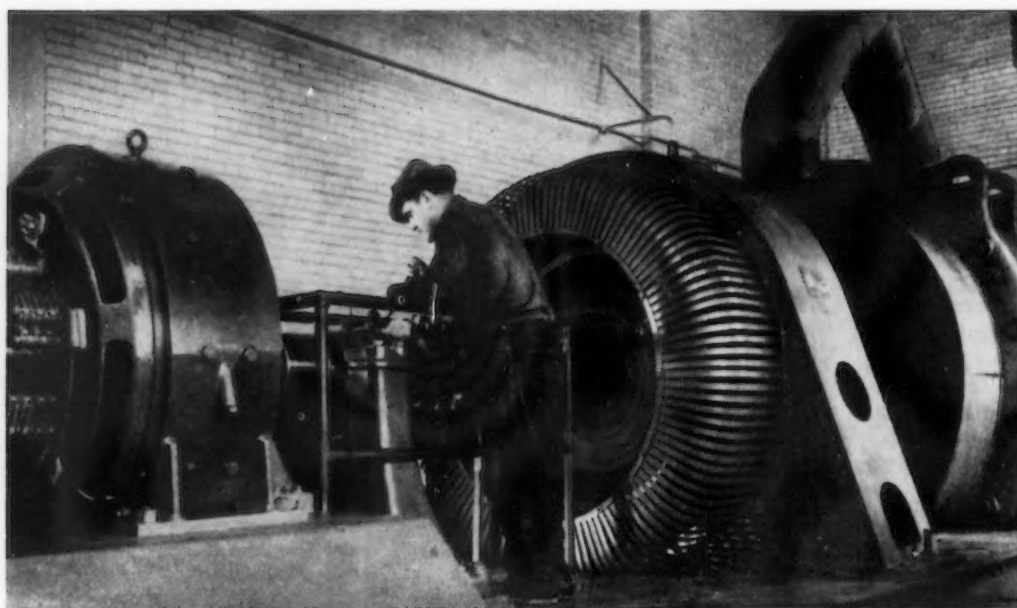
"The second innovation," Mr. Tainton said, "is in the use of dies for polishing and densifying the

zinc coating. Both from a theoretical and practical point of view the die produces the best possible physical characteristics. It compresses the zinc to maximum density and so increases conductivity so important in telephone wire. It provides a perfectly smooth bright coating of minimum area and consequently longest possible life. It ensures the rejection of any wire that is out-of-round, below-gage, or otherwise imperfect. It imposes an obligation on the organization that both the wire and the coating shall be practically perfect at all times."

Comparison With Hot-Dip Process

In comparing the new process with the well-known hot-dip method, L. H. Winkler, metallurgist, Bethlehem Steel Co., stated that, "as a result of the tenacity of the bond and the ductile qualities of this new zinc coating, wire may be successfully fabricated with any desired weight of zinc coating without danger of injuring that coating even in the slightest degree. The result is that the joints of fence fabricated from this wire have a continuous coating of zinc which has not been reduced in thickness by any flaking or powdering as a result of the distortion incident to its fabrication.

"In addition to being able to produce coatings of these remarkable mechanical properties," Mr. Winkler went on, "it is possible to produce any desired weight of coating, covering a full range from the thinnest coatings to coating weights up to three or more times the thickness of the heaviest which could be produced by the hot-galvanizing method."



THIS homopolar generator built especially for the Bethanizing process furnishes current up to 40,000 amp. at a very low voltage. It was built by the Hanson-Van Winkle-Munning Co., Matawan, N. J.

Management Group Discusses Problems Of Converting Plants From Depression To Normal Basis

TODAY'S problems of manufacturing executives were discussed at a conference of the job-order production and mass production divisions of the American Management Association at the Statler Hotel, Cleveland, April 16 and 17. The problems were treated from the viewpoint of changing from a depression to a production basis of plant operation.

Seven problems were selected for consideration and each was discussed in two papers. At the close of the last session there was a summarization of the various problems discussed in which a number of speakers participated.

The seven problems considered were: Rebuilding the working force; revamping equipment and plant layout; restoring effective production control; rekindling incentives; revitalizing the supervisory force; intensifying quality control and keeping a tight rein on costs.

Charles J. Stilwell, vice-president, Warner & Swasey Co., Cleveland, presided at the annual dinner Thursday evening. The speaker at the dinner meeting was C. D. Barr, vice-president, American Cast Iron Pipe Co., Birmingham, who, in discussing the human factor in industry, outlined the Eagan plan of industrial democracy, which his company follows for the improvement of employer-employee relations.

Rebuilding of Working Force

In discussing the rebuilding of the working force, Everard Stubbs, factory manager, Fellows Gear Shaper Co., Springfield, Vt., said that the problem that many now face is to train as rapidly as possible men who will not only be more skillful than those of the passing order, but who will be more adaptable and quicker to understand new mechanisms, to machine a variety of parts with simpler equipment and to change over frequently for smaller quantities than in the past.

At first, he said, this task seems difficult, but he pointed out that with automobiles, radios and aircraft, most boys are now well versed in handling fairly complicated mechanisms and are fitted for much faster training than in years past. To train a flexible, versatile working force, he said that every capable and ambitious

man should be transferred from any job which has become to him routine work in order to stimulate his thinking and improve his skill by new experiences. Courageous and capable workers should be picked out and their courage and capabilities improved by giving them work which will keep them on their toes. Adaptable, quick-thinking men can be readily trained, provided the employment office carefully selects men of capacity and changes them frequently from one job to another. When new workers are hired less interest should be shown in experience than in character, energy, intelligence, loyalty and teamwork. Many, he said, have wasted years in trying to improve a man's character.

Improved Factory Methods

Manufacturing methods are thoroughly reviewed by various department heads and methods of handling are analyzed before revamping equipment and plant layout in the plant of the Remington Arms Co., Inc., Bridgeport, Conn., the procedure being outlined by F. J. Van Poppelen, industrial engineer of that company. He said that through changes the distance of travel of one type of cartridge from raw metal to warehouse was reduced from 8130 to 2000 ft. or 74 per cent, and the number of handlings was reduced from 60 to four.

"If equipment will not repay in operating savings 20 per cent of its cost each year, I do not buy it," said Ralph F. Cohn, factory manager and secretary, Reynolds Wire Co., Dixon, Ill. "The old machine may not be as safe and may not turn out a quality product," he said, "but it should not be replaced until a unit is found that has these features and at the same time lowers production costs."

Evaluating the Foreman

"A careful evaluation of the abilities, duties and personality of the foreman is an important step in rekindling incentives," declared I. H. Freeman, supervisor industrial relations, General Electric Co., Fort Wayne, Ind. The foreman should be of a high standard, both technically and personally and should be responsible for just the number of operators he can effectively supervise. No incentive plan, he said, is better than the

standards established and as it is a proved fact that motion study develops positive standards, one step in rekindling incentives is by means of motion study. An incentive plan should have as its objective a reduction in cost, accompanied by increased earnings to the worker. These considerations have been the foundations of incentive plans in the past, he declared, and will continue to be the basis of successful plans in the future. Prior to the depression, Mr. Freeman stated, security of employment was taken for granted and had no incentive value, but today this factor has become quite important in the consideration of incentive plans and several employers have incorporated this factor in their wage policy with gratifying results.

Where conditions permit the guaranteeing of a definite weekly wage for a definite period, the employee's mind is freed from the possibility of unemployment and his feeling of safety has a marked effect in producing a good day's work.

Quality Control

In discussing intensifying quality control, J. Carlton Ward, Jr., assistant general manager, Pratt & Whitney Aircraft Corp., said that to make quality standards effective they should be established by the engineering department, which in turn is responsible also for inspection and performance requirements. This plan divorces the quality manager and inspector from the factory management. It is necessary to spread through the organization that quality standards are set only after careful consideration and that they can be changed only when facts show that a change is wise. In his plant quality standards are reviewed and revised each time a general revision is made to the design. In the Pratt & Whitney aircraft factory the responsibility for designing and furnishing specialized inspection equipment is placed squarely in the hands of the production engineering department.

In considering keeping a tight rein on cost R. A. McCarty, manager, Generator Division, Westinghouse Electric & Mfg. Co., explained the budgeting system of that company. He stated that to improve the over-all cost control in the manufacturing department a cost control group has been created which follows the larger contracts through all their stages. Keeping a rein on costs was also discussed by Frank Klein, director of budgets, Worthington Pump & Machinery Corp., Harrison, N. J.



Improvements in Production

New Die Cutting Pantograph Machine Equipped for Three Dimensional Work

THE George Gorton Machine Co., 13th St., Racine, Wis., has added 3-dimensional machines in two sizes, to its line of pantograph machines for engraving and die and mold cutting. These machines are adapted to all kinds of dies and molds having ornamental designs, lettering, etc., such as die-casting dies, and molds for glass, plastics and small rubber products. They supplement the company's duplicator machine line, by reproducing in reduced ratio, direct from models of any shape or contour. This makes possible the production of dies in almost any desired size, from one model. The new machines will also do any of the work accomplished with older type Gorton machines.

Reproduction may be from models of stone composition, bakelite, hard wood, etc., or from metal templates and master copies. Reproduction ratios range from one-half to one-eighth size of model or master. Among important advantages not found in competing

foreign machines of the same type is the fact that cutter spindle and tracer are always truly vertical with relation to work. Depth of cut is not obtained by hinging the pantograph, thus causing an undercut on one side of a deep mold.

Uniform pressure of tracer against model is maintained at all pantograph positions because design eliminates the need for a counterweight to balance the pantograph. This construction provides easier operation, because operator does not have to lift and hold pantograph against the thrust of cut in two directions. Gorton machines also provide large work holding capacity and an unobstructed view of the cutter at all times.

The machines are accurately made for precision work. They have high-speed spindles mounted on super-precision ball bearings. All pantograph joints are ball bearing, as are the motor drive parts. Table, saddle and knee are of a simplified, conventional milling machine type, with hand feeds.

Castings are nickel semi-steel normalized. Spindle parts are alloy steel, hardened and ground all over. Flat surfaces are accurately hand scraped to surface plates, pulleys are dynamically balanced. Chip guards, dust seals, etc., are provided throughout.

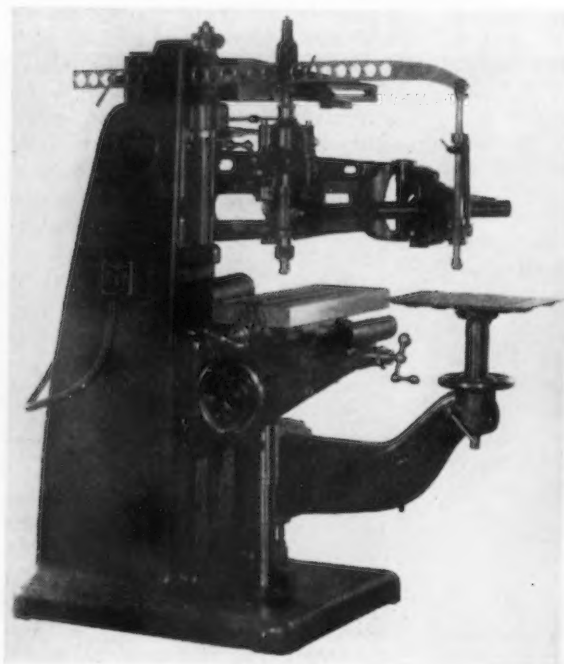
A small size, 3-B, machine will cut a maximum size cavity 6 x 12 in., and almost any depth, in one setting; the larger work can be reset. The machine takes cutters to 1/4 in. diameter with six spindle speeds 3800-9900 r.p.m. and is driven by 1/4-hp. motor. Net weight is 850 lb.

A medium size, 3-L, machine will cut a maximum size cavity 9 x 18 in., and takes cutters to 3/8 in. diameter. There are nine spindle speeds, 1100-9200 r.p.m. Drive is by a 1/2-hp. motor. Net weight is 2100 lb.

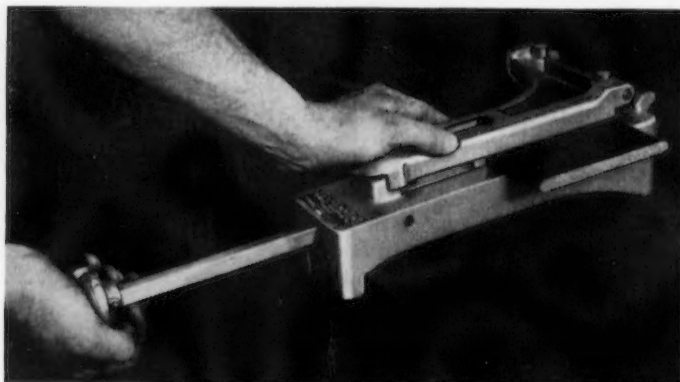
Portable Belt-Cutter

FOR clean and square cutting of any belt (except metal stitched) up to 1/2 in. thick by 8 in. wide, the Flexible Steel Lacing Co., Chicago, is offering the new "Alligator" belt cutter illustrated. A combination guard and equalizing hold-down clamp holds the belt immovable while the cut is being made. The knife is mounted on a plunger in a slot and is operated easily by a direct arm push without mechanical leverage, slicing the belt off clean and square. The knife, made of alloy steel, will make several thousand cuts and is readily replaceable. The clamp and frame are of an aluminum alloy.

Weighing but 4 lb. and 3 oz., this belt cutter is easy to handle.



FRONT view of a new, 3-L, pantograph machine. Cutter spindle and tracer are always truly vertical with relation to work.





Duplex Equipment for Simultaneous Two Teeth Single Gear Chamfering

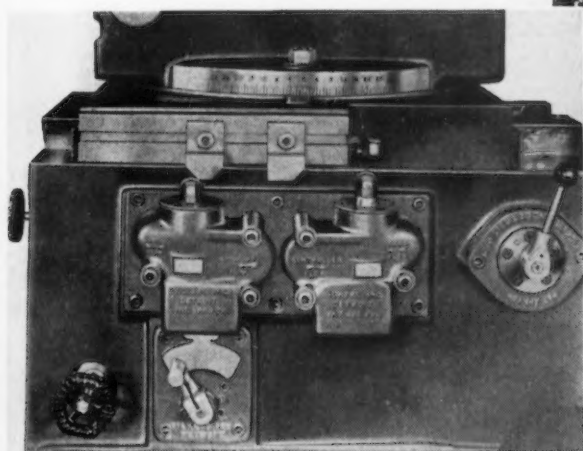
AN improved model, duplex, gear tooth chamfering machine, by Cimatool Co., Dayton, Ohio, involves larger and heavier construction, permitting chamfering and burring of all external gears up to 13 in. diameter, at cutting speeds as high as 300 gears per min. Included is provision for chamfering two teeth simultaneously on the same gear. The mounts for cutter spindles are stationary during the work period. These mountings, on either side of the work head, have swivel adjustment in a horizontal plane in order to provide for any required angle on the face of the chamfer. Each spindle has vertical swivel adjustment through a fulcrum for angle on chamfer or roundness in the

dle has independent motor drive for rotation of cutters.

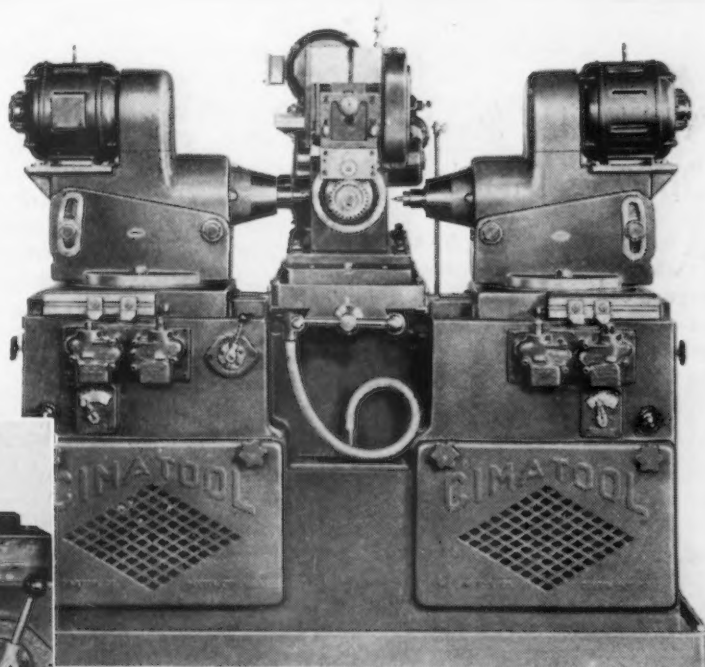
A new design anti-friction work head is employed. It is centrally located on a table having front to back movement on a scraped dove-

ly above or below center. Movement is through a standard electric motor driving a gear reduction unit by V-belt and pulley; the unit is integral with the work head.

Machine flexibility, combined with the ease with which cutter shape may be changed, provides an extreme range of chamfer shapes and roundness on both regular and intermittent cuts and reliefs. The coolant system is in-



AT left, operating control details, described in final paragraph, are illustrated.



chamfering of helical gears. Front and back adjustment is also provided for the spindles to compensate and match cuts on original set-up. Graduated scales supply convenience and accuracy in making adjustments. Conveniently controlled hydraulic power provides movement of spindle units to and away from work pieces in loading and unloading. Each spin-

tail slide. Continuous rotating indexing action is timed with a forward and backward motion produced by a cam, so developed that the resulting rotation and longitudinal movement presents teeth to cutter as required by the shape of chamfer desired. The work head is also mounted on an intermediate incline which provides for rapid adjustment of work, vertical-

dividual, but is easily converted into a central system if so desired.

The hydraulic control layout is illustrated at left. The main control handle is at the extreme right. Immediately to the left are the feed valve and the rapid traverse valve. Below these is a convenient adjustment for setting rate of feed. The two remaining valves, at extreme left, control evenness of flow in the individual cutter spindles and serve as shut-off valves. Easily removed front cover plates, above, give quick accessibility to hydraulic and coolant pumps and motors.



ALL driving mechanism, adjustment shafts, etc., are below floor level in a new 500-ton capacity steel press brake, said to be one of the largest of its type ever assembled. The machine is of welded construction throughout.

All-Welded Steel Brake Operates Dual Leaves

A 500-TON capacity steel press brake, said to be one of the largest of its type ever manufactured, and capable of bending materials 16 ft. long, is announced by the Boom Boiler & Welding Co., Cleveland.

Through new design, the brake pulls two leaves together instead of pushing one leaf down. This permits easy adjustment for bending through raising or lowering the bottom leaf which is moved by worm drive controlled by a switch mounted on the front of the machine.

All driving mechanism, adjustment shafts, etc., are below floor level, leaving the entire top clear and eliminating danger resulting from possible overhead breakage.

The new brake is 24 ft. 2 in. over all, 16 ft. 1 in. between housings, 7 ft. 1 in. wide, 9 ft. 11 in. extreme height, and 6 ft. 9 in. above the floor. The weight is 61 tons.

The two leaves are 17 ft. 7 in. long, 4 ft. high, 10 in. thick and weigh 8 tons.

Links are 8 ft. 3 in. long over all, 8 in. thick and 3 ft. 4 in. wide from drive center to the link's outside.

Bending members are of high-carbon steel, machined to meet bending requirements.

Full arc-welded steel construction is said to have permitted 30 days' saving in time and \$2,200 in cost through elimination of patterns and pattern drawings. Machining costs are said to be \$1,500 less than with castings.

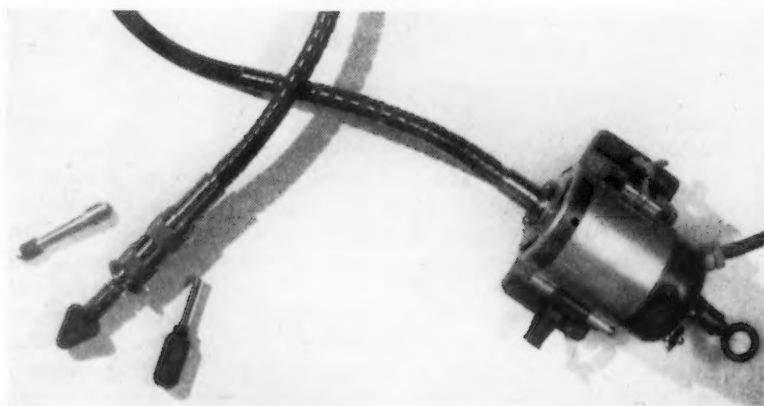
All welding was done by the shielded arc process with equipment supplied by the Lincoln Electric Co., Cleveland.

Operating power is furnished by a 30-hp. electric motor in conjunction with a 2-ton flywheel and is transmitted by V-belts to gears and shafting. Operation is two-speed—4 or 20 strokes per min.

Flexible Shaft Units for High-Speed Use

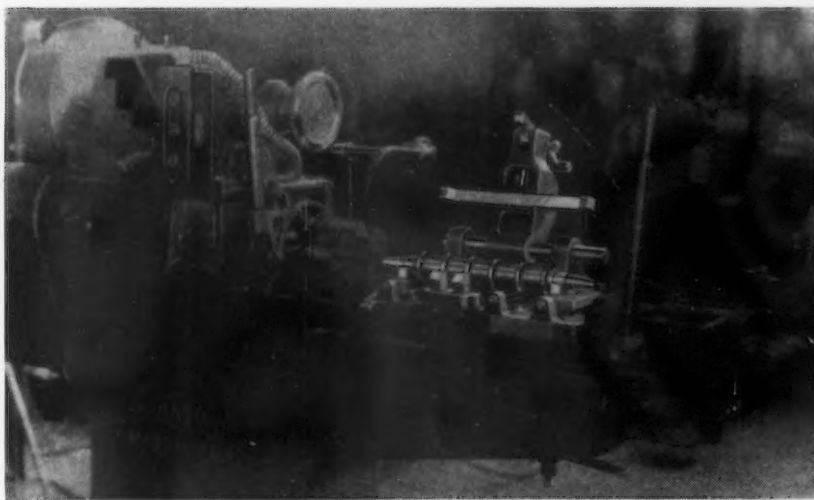
THE Charles L. Jarvis Co., Gildersleeve, Conn., announces the "Speedwitch" high-speed flexible shaft unit for high-speed grinding, sanding and polishing, with profile-shaped wheels up to and including 2-in.

The equipment is suitable for mold, pattern and die work and for cleaning welded joints. The hand-piece is full ball bearing and utilizes precision bearings for thrust as well as for radial load. The motor is 1/3 hp., 18,000 r.p.m.



Double End Threading Fixture

A WORK-HOLDING fixture designed to assure concentricity between threaded ends is being marketed by the Landis Machine Co., Waynesboro, Pa., for use on that company's threading machines. The illustration is of the fixture applied for threading both ends of a Diesel engine camshaft. The camshaft is held in V-grips of hardened steel and gripped on the bearing surfaces at each end of the shaft. Final clamping is by a special self-aligning member which is shown in open position. The flexibility of design is such as to provide adaptability for a wide range of work.



ACCURACY and alinement in double-end threading, on a production basis, are said to have reached a commercially practical perfection through a fixture design shown as utilized on a Diesel engine camshaft set-up.

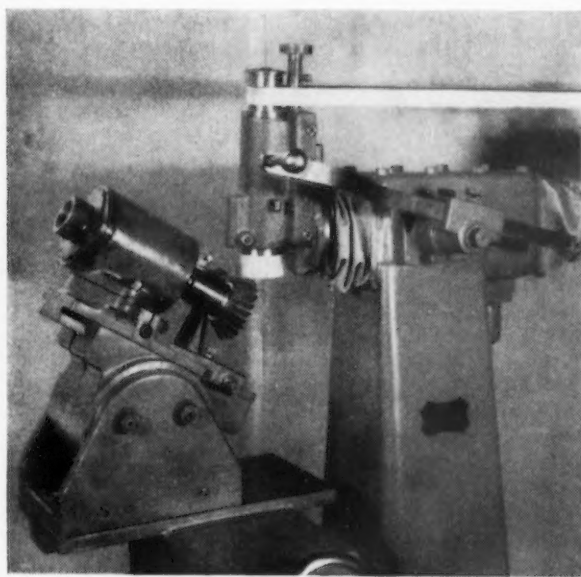
Equipment for Rapid Cutter Grinding

THE grinding of angular cutters, dovetail cutters and the end teeth of end mills is particularly provided for in the design of a new universal tool and cutter grinder by the Oliver Instrument Co., Adrian, Mich. Set-up for a dovetail cutter is shown in the close-up view. Cutter mounting is in a bearing which is attached to a universal fixture. Procedure is, set to the angle of the cutter; at-

tach liprest to the slide; adjust blade; set the clearance angle of the wheel by tilting to direct reading angle and sharpen. The work is directly in front of the operator and the tooth under grinding operation is always in view. Teeth may be backed off without changing the setting of the cutter.

The grinding wheel is reciprocated by means of a ram, the wheel being mounted at the front and the

motor at the back, with belt drive connection. These working parts, ram, spindle and motor, are located above the grinding wheel and away from the flow of emery. A collapsible type of protection against dirt is provided. The universal fixture unit is adjustable in all directions and affords support for necessary tool-holding fixtures. Weight is 1000 lb. Motor, $\frac{1}{2}$ hp.



THE design of a new cutter grinder provides that the machine and equipment shall be particularly efficient and rapid on certain classes of cutter grinder work. The numbers of tools in these classes, it is held by the makers, warrant the time-saving obtainable through machine use.





THIS WEEK ON THE ASSEMBLY LINE



... Production and sales of automobiles approach high levels of 1928 and 1929.

o o o

... High rate of activity likely to be extended well into May.

o o o

... Brilliant colors prove to be attractive spring selling feature.

o o o

... All is comparatively quiet on labor front, with Toledo successfully meeting problems with new plan.

DETROIT, April 21.—For comparable figures on the current volume of sales and production of automobiles, one has almost to go back to the boom days of 1928 and 1929. Cram's estimate of production for the week ended April 18 was 119,834 units, a rise of 7000 from the week before and representing the eighth consecutive week in which production has gained. At the present moment it appears that there will be further rises for perhaps two more weeks before the production curve is leveled out.

Commitments for steel for May delivery are in such volume now as to indicate that the car manufacturers believe that production will be sustained in excess of the 100,000 mark well into May and perhaps into June.

Last year output experienced a sharp decline during May, but no such sudden descent from the present high level of production is expected this year. In the first place,

dealers are not over-stocked, except perhaps in the lower price classifications, and in many instances backlogs of orders could keep many plants going at the present rate until the end of the month without any influx of new orders. Even the used car situation is easing up as spring buying sets in, despite the relatively high volume of new car sales which would tend to increase dealer stocks of used cars. By mid-summer, it is expected that the payment of adjusted compensations to veterans will add further stimulus to the used car market, as well as to the new car market.

Chevrolet Still Leads

Chevrolet still leads the pack in terms of production and sales volume, although Plymouth has shown the largest gain in production, 93 per cent, from the February low. Chevrolet production is up 77 per cent from its low, whereas Ford is up only 26 per cent. This does not mean that Ford has been suffering

necessarily such a disparity in demand, but that the company has been battling them out at a pretty even figure for the last six months. The variations of the Ford payroll have been very minor during this period. In fact, the whole industry has set a record that would make previous peaks and valleys in employment appear like pretty bad management in comparison.

As if to show what the present trend in retail sales is, Buick reports sales for the first 10 days of April as better than any similar period since 1928 and more than three times the volume of the corresponding 1935 period. April deliveries are 72 per cent ahead of the first 10 days of March and 225 per cent over the corresponding period of February, indicating a very pronounced upturn. Studebaker sales for the first 10 days showed an increase of 65 per cent over the corresponding period of 1935 and a 40 per cent gain over the March figure. Hudson reports retail sales for the week ended April 11 as the best single seven-day period since 1930. The figure showed a gain of 37 per cent over the corresponding week a year ago. Production schedules for April have been set up for 16,000 units, 5000 more than the maximum output for any month in 1935. Reflecting this better business, earnings for the first quarter of this company will be greater than for any first quarter since 1930.

Even foreign sales have been showing a marked pick-up in recent months. Sales of General Motors cars and trucks, for example, to dealers in overseas markets during March totaled 32,798 units and represent the highest sales volume of any month since May, 1929, and 23 per cent over the volume in the corresponding month of last year.



First quarter sales abroad showed a 24½ per cent increase.

Colors Used to Promote Sales

One of the stunts being used this year to stimulate sales is the use of spring colors. General Motors' art and color section, for example, has a group of color experts whose job it is to keep their fingers on the pulse of the public taste through constant study of the popularity of each color used by all divisions of the corporation, as well as by an intimate knowledge of style trends in clothing, furniture and other modish commodities. The spirit of the times is reflected in the popularity of colors for automobiles just as in general business. When national affairs, business and industry are in the doldrums, colors are drab and dull. When there is a spirit of optimism and prosperity afloat, car colors, like the vogue in Easter bonnets, are bright and rich. That this is no mere theorizing of psychologists has been demonstrated by recent sales of cars in flashy colors. These colors have proved to be a definite stimulant to sales. We now see a Caribbean metallic blue, a silver streak metallic gray, an Arno blue and a Neptune green. The metallic lusters seem to be coming into popular favor again, although the public interest in them was not sustained when they were first introduced a few years ago.

Used Cars Still a Problem

While automobile manufacturers announce new sales records and a continued rise in profits, the dealer groups still struggle along under that Old Man of the Sea, the used car. A recent step in the direction of putting profits into the retail end of the business is the announcement of the establishment of the

By FRANK J. OLIVER
Detroit Editor, *The Iron Age*

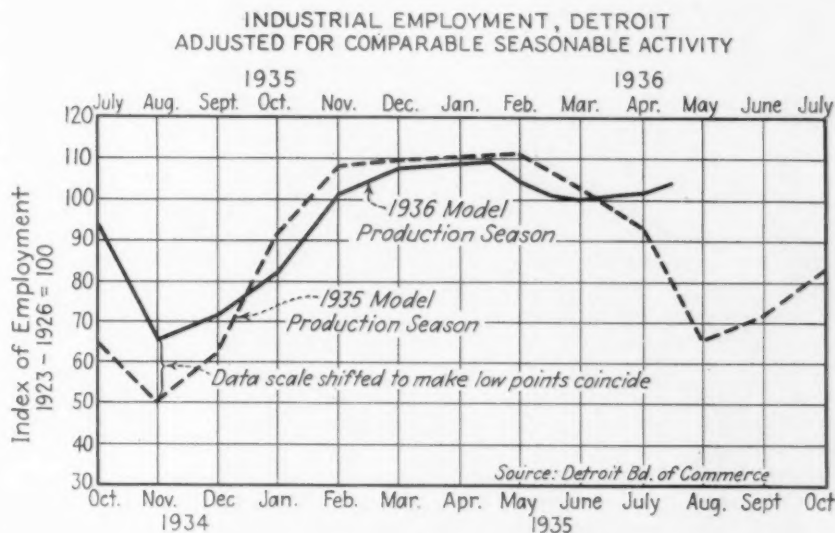
Automobile Dealers Research Foundation jointly sponsored by the National Automobile Dealers Association and the American Finance Conference, composed of independent finance companies and the N.A.D.A. The purpose of this central agency is to gather data concerning operations of automobile dealers and to analyze and assemble those facts for the benefit of the industry. Survey after survey has brought to light that dealer groups as a whole have been losing money on their over-all operations. One of the latest reports made available is that of the Pennsylvania Automotive Association, which shows that 314 dealers in that State, on a combined retail new and used car volume of \$68,-

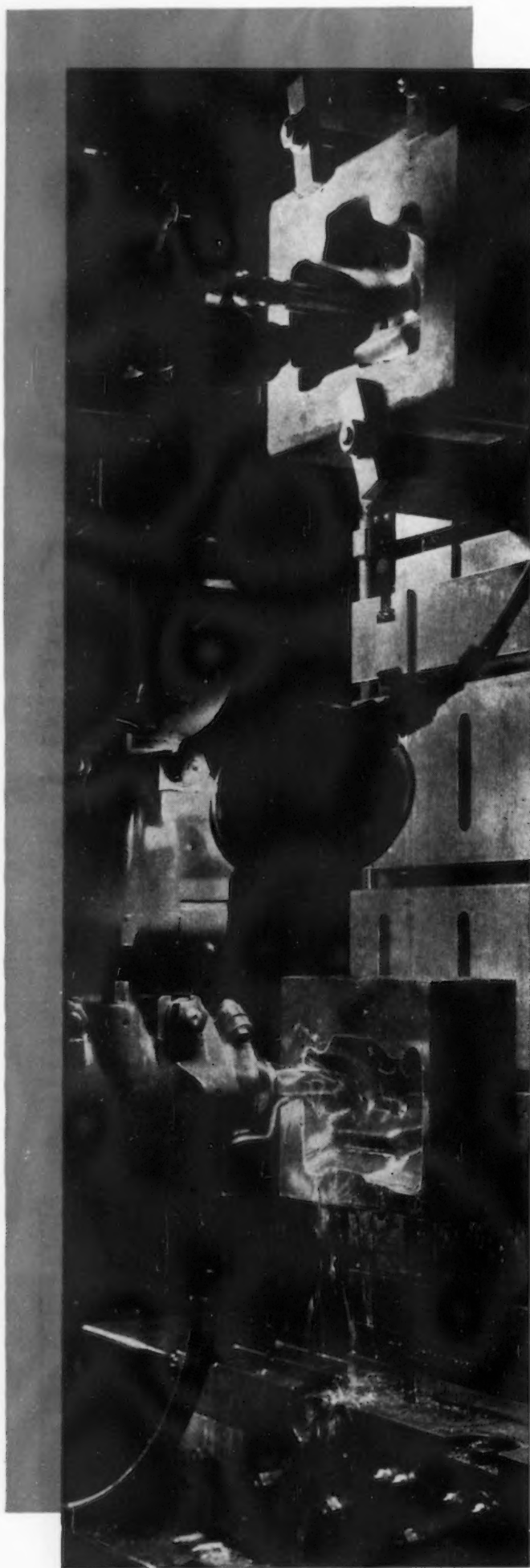
465,777, sustained a net loss of \$320,804—approximately ½ of 1 per cent on the volume. Of this amount, used car gross losses represented 4.6 per cent. Ford dealers, with the lowest new car margins, were the only group to show a used car gross profit. General Motors dealers other than Chevrolet enjoyed the largest new car margin, but they had next to the largest percentage of used car gross loss on used car sales. Nevertheless they showed a profit on their combined operations.

Incidentally, N.A.D.A.'s estimate of 1935 retail business is placed at \$4,950,059,706, a gain of 40 per cent over the 1934 figure of \$3,354,119,201. During 1935 the number of firms engaged in selling and servicing automobiles increased from 36,000 to 39,000.

Automotive Makers Leave Chamber

The Automobile Manufacturers Association found it expedient last week to resign from the Chamber





The **KELLER METHOD**

Here is the simple story

A forging die is to be made. As it will probably last longer than the life of its product, no duplication is involved. So we cast a master in artificial stone, and mount it on the upper section of the adjustable angle plate fixture on a Keller Automatic Tool Room Machine, Type BL.

The heat treated alloy steel die block is bolted to the lower section of the fixture. It is a heavy block, but there is no need to be too fussy about setting it up accurately. The two sections of the angle plate fixture, the extension of the cutter, and the relative positions of the tracer and spindle in all three dimensions are easily adjustable. There isn't the slightest trouble in compensating for the different thicknesses of model and die, or in getting the impression in its exactly correct position on the die block.

The tracer point is screwed on and the cutter is set into the tapered bore of the spindle, held firmly by a threaded drawbar against any possibility of slipping.

Then the cut is started. There is plenty of metal to be removed, and it is heat treated alloy steel, but the cutter buries itself to full depth, cooled and cleared of chips under the flood of compound that pours into the cavity and washes down the face of the die. As it goes deeper into the job or hits a tough spot in the steel the feed automatically slows down, and then as the cutter works itself to a lighter part of the cut it immediately speeds up. Always the machine is working to full cutter capacity, without babying the cutter and without cutter breakage.

And the operator stands by watching the smoke—and the rapidly mounting pile of chips.



PRATT & WHITNEY

Division Niles-Bement-Pond Co.

HARTFORD, CONN., U. S. A.

of Commerce of the United States, and to join the National Association of Manufacturers. Alfred Reeves, speaking for the A.M.A., indicated that the United States Chamber had too diversified a membership, composed of bankers, insurance men and railroad men, whereas the manufacturers' association is composed solely of manufacturers and "sees everything from the manufacturer's standpoint." Behind this surface explanation there is talk of a dispute between the A.M.A. and the chamber which began at the chamber's convention a year ago when a resolution was passed calling for the establishment of Federal regulation and coordination of all forms of interstate transportation. The automobile group felt at the time that the resolution was dictated by railroad interests and did not concur in its passage.

The Society of Designing Engineers' first test of strength with the Chrysler Corp. proved to be a fizzle last week. Whereas the society claimed to represent 450 of the 700 or more employees of the Chrysler engineering department, only 125 persons participated in the poll which was held under the jurisdiction of the National Labor Relations Board. Out of those voting, 121 designated the society as their bargaining representative. This particular group is unique in the fact that it represents a skilled class of labor, mostly draftsmen, heretofore unorganized. The group was credited with accomplishing a general pay increase for Chrysler draftsmen last summer, a move on the company's part designed perhaps to head off a concerted demand for even greater concessions. It is obvious that this particular labor group will not be very seriously considered from this time on, at least by Chrysler.

While technically a strike continues to exist at the Motor Products Corp. plant, to company officials there is no such thing, and, as if to prove it, the corporation announced March quarter net profits of \$274,475 as against \$292,285 a year ago. While the firm undoubtedly has been handling a smaller volume of business owing to the loss of certain contracts during the early strike stages, actually it has discovered a number of production economies by making more efficient use of the present force.

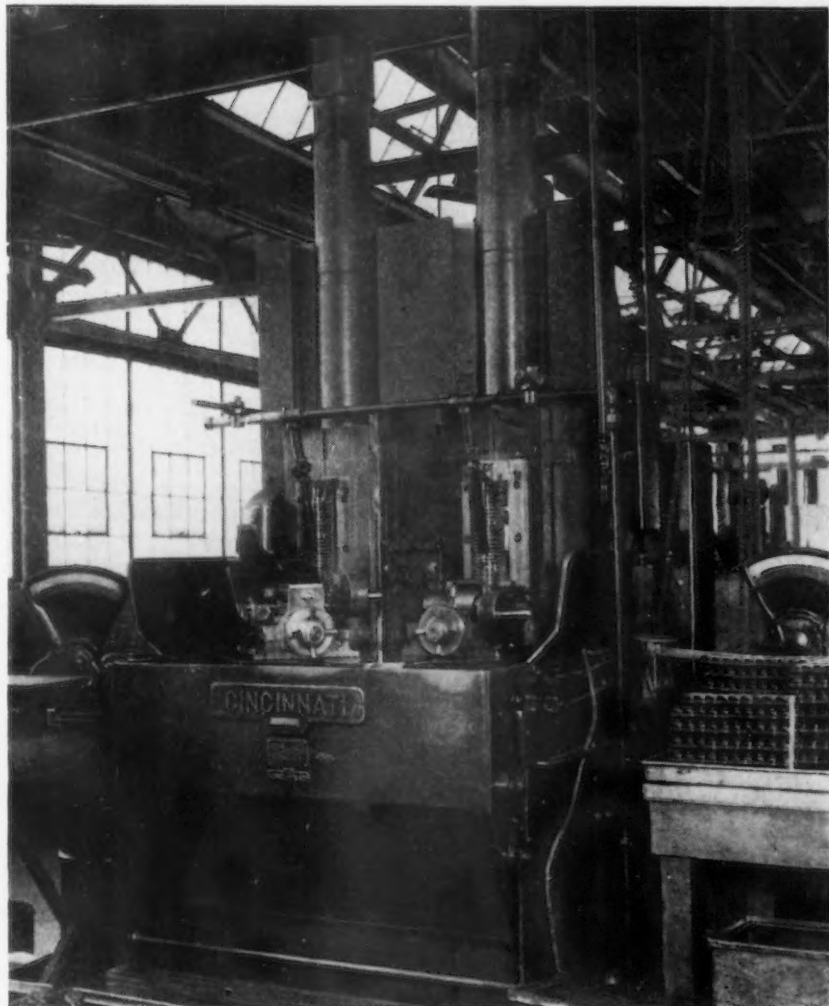
Toledo has been engaged in a very sincere effort to keep industrial peace and the city recently budgeted funds to finance the Industrial Peace Board, which has been in operation now for almost a year. Last week a former labor reporter for the Toledo News-Bee

was named director of the board. It is interesting to note that the peace plan was inspired by the editors of the three metropolitan dailies. Since the inauguration of the plan industrial unrest has practically ceased to exist in Toledo, and the few sporadic strikes that have broken out have been quickly settled. Right now, however, 50 workers of the Moto-Meter Gage & Equipment Corp. are out on strike, members of the United Automobile Workers, A. F. of L. affiliate.

In line with transmissions, overdrives seem to be getting quite a bit of attention right now and it is more than likely that Dodge, Plymouth and Chevrolet will offer overdrive transmissions, at least as optional equipment. All three will go to the hypoid rear axle drive. Packard adopted the hypoid gear in 1926, primarily because of its greater quietness and longer life. In use in a car they are self-generating, as far as wear is concerned, insuring continuous quiet operation. Pinion teeth are larger

and stronger than those found in an ordinary spiral bevel pinion and more pairs of teeth are simultaneously in contact. This reduces gear tooth pressure, thus insuring longer life. What is perhaps more important, however, is the fact that the pinion can be placed below the center line of the ring gear, enabling the propeller shaft to be lowered several inches.

In effect, the hypoid gear is halfway between an ordinary spiral bevel pinion and a worm gear. Worm gears were tried in passenger cars several years ago, notably in the Pierce-Arrow, but were dropped because of several serious drawbacks, mainly their inefficiency and tendency to heat. Recently, however, worm gear drives have been considerably improved, and it is understood that Ford is seriously considering the adoption of such a drive to carry the lowering of the propeller shaft to an even greater extent than the hypoid affords and incidentally to provide something different from the competition.



BROACHING is assuming increasing importance in automotive manufacture. This machine, one of three especially developed for Chrysler, is a 150-ton twin-ram broaching machine for connecting rods and caps. Control of operation is so precise that when the rods are finished they weigh the same, end for end, at a fixed center of gravity within plus or minus two grams.

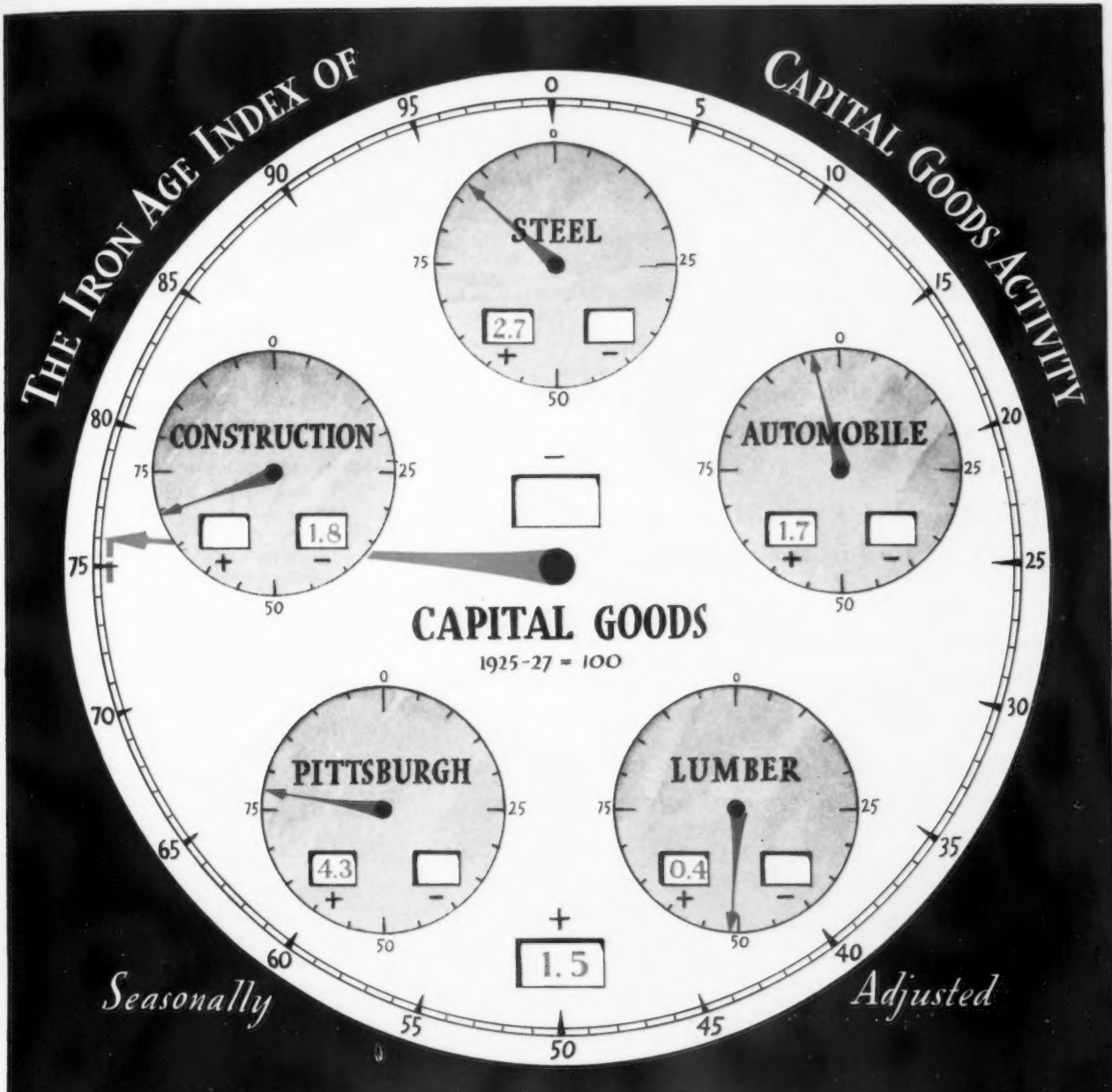
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	March, 1936	February, 1936	March, 1935	Three Months 1935	Three Months 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a	2,897,867	2,632,306	2,582,966	7,330,648	8,481,741
Coke production (net tons) ^b.....	.....	3,293,542	3,012,692	8,775,676	.....
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,040,311	1,823,706	1,770,028	4,855,916	5,889,902
Pig iron output—daily (gross tons) ^c	65,816	62,886	57,098	53,955	64,724
Castings:					
Malleable castings—production (net tons) ^d.....	.....	40,449	42,808	127,585	.....
Malleable castings—orders (net tons) ^d.....	.....	38,110	40,237	126,030	.....
Steel castings—production (net tons) ^d.....	.....	47,954	31,940	90,662	.....
Steel castings—orders (net tons) ^d.....	.....	51,701	30,723	94,970	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	3,346,489	2,967,803	2,868,141	8,517,437	9,363,731
Steel ingot production—daily (gross tons) ^e	128,711	118,712	110,313	110,616	120,048
Steel ingot production—per cent of capacity ^e	58.65	54.09	49.83	49.97	54.70
Finished Steel:					
Trackwork shipments (net tons) ^e	6,258	4,116	3,440	8,665	13,740
Steel rail orders (gross tons) ^e	62,300	147,450	79,418	210,592	424,291
Sheet steel sales (net tons) ^f.....	.....	138,244	193,057	698,210	.....
Sheet steel production (net tons) ^f.....	.....	191,359	227,082	681,858	.....
Fabricated shape orders (net tons) ^f.....	.....	114,545	102,325	242,472	.....
Fabricated shape shipments (net tons) ^f.....	.....	69,855	85,132	243,286	.....
Fabricated plate orders (net tons) ^d.....	.....	27,830	16,832	50,674	.....
Reinforcing bar awards (net tons) ^e	24,025	23,830	17,335	57,350	115,665
U. S. Steel Corp'n. shipments (tons) ^h	783,552	676,315	668,056	1,785,248	2,181,281
Ohio River steel shipments (net tons) ⁱ	116,510	13,782	75,072	192,097	196,052
Fabricated Products:					
Automobile production, U. S. and Canada ^k.....	.....	304,232	451,768	1,108,941	.....
Construction contracts, 37 Eastern States ^l	\$199,028,300	\$142,050,200	\$123,043,500	\$297,864,500	\$545,871,300
Steel barrel shipments (number) ^d.....	.....	508,974	525,022	1,366,284	.....
Steel furniture shipments (dollars) ^d.....	.....	\$1,484,145	\$1,220,533	\$3,424,249	.....
Steel boiler orders (sq. ft.) ^d.....	.....	810,387	647,062	1,322,572	.....
Locomotive orders (number) ^m	13	46	8	9	73
Freight car orders (number) ^m	627	7,236	0	830	8,907
Machine tool index ⁿ	105.3	112.1	62.3	†60.3	†109.4
Foundry equipment index ^o	115.0	110.4	69.3	†77.2	†117.4
Foreign Trade:					
Total iron and steel imports (gross tons) ^p.....	.....	43,358	21,409	73,098	.....
Imports of pig iron (gross tons) ^p.....	.....	14,660	2,708	15,482	.....
Imports of all rolled steel (gross tons) ^p.....	.....	18,208	13,292	40,789	.....
Total iron and steel exports (gross tons) ^p.....	.....	213,736	323,035	814,312	.....
Exports of all rolled steel (gross tons) ^p.....	.....	65,947	78,483	219,208	.....
Exports of finished steel (gross tons) ^p.....	.....	62,322	68,146	193,816	.....
Exports of scrap (gross tons) ^p.....	.....	142,165	228,338	559,688	.....
British Production:					
British pig iron production (gross tons) ^r	633,600	584,700	554,200	1,558,500	1,814,200
British steel ingot production (gross tons) ^r	980,100	938,500	841,900	2,369,200	2,831,100
Non-Ferrous Metals:					
Lead production (net tons) ^s.....	.....	34,127	32,921	89,730	.....
Lead shipments (net tons) ^s.....	.....	33,086	28,973	95,191	.....
Zinc production (net tons) ^t	42,483	36,228	36,735	105,338	120,628
Zinc shipments (net tons) ^t	38,159	39,918	41,205	111,537	124,545
Deliveries of tin (gross tons) ^v	5,520	5,600	5,495	14,000	17,755

†Three months' average.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp'n.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



Same Week Last Month	Preceding Week	Last Week
73.5	74.5	76.0
69.7	85.1	87.8
87.7	94.6	96.3
56.4	51.1	51.5
68.5	73.1	77.4
64.4	68.7	66.9

COMBINED INDEX		
Steel Ingot Production	57.5	61.5
Automobile Production	58.1	65.0
Lumber Shipments	86.8	72.6
Pittsburgh Industrial Production	46.5	66.2
Heavy Engineering Construction	56.8	64.2
	39.5	38.7

Same Week 1935	Same Week 1934	Same Week 1933
57.5	61.5	33.0
58.1	65.0	30.2
86.8	72.6	35.0
46.5	66.2	34.4
56.8	64.2	39.0
39.5	38.7	27.4

ACTIVITY in capital goods producing industries is again more pronounced. As measured by THE IRON AGE index, average aggregate activity increased 2 per cent last week to 76.0 per cent of the index's base-period average. At the same time, the index advanced 3.4 per cent above its level of a month ago and 32.2 per cent above its comparable 1935 showing. Sharp gains in industrial operations in the important Pittsburgh area, increased automobile assemblies,

a higher national steel ingot rate and slightly improved lumber shipments were factors in promoting the index's better showing. Heavy engineering construction awards were stimulated by placing of contract for Jones and Laughlin's sheet and strip mill at Pittsburgh, but volume of work currently in progress receded slightly. Heavy orders from distributors caused automobile makers to step up production.

Components of The Index: (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.



... President's Baltimore speech clearly indicates new attempt to revive NRA.

o o o

... Ellenbogen bill would create a little Blue Eagle to fly around in textile industry.

o o o

... Circumvention of Supreme Court's Schechter decision gets much attention in Washington.

o o o

... Federal Trade Commission moves against auto parts manufacturers and jobbers.

o o o

BY L. W. MOFFETT
Resident Washington Editor,
The Iron Age

o o o

WASHINGTON, April 21.—Any lingering doubt that the New Deal has in mind revival of NRA or an alter ego was dissipated by President Roosevelt in his Jefferson Day address at Baltimore. . . . It is true that the President did not say definitely that such is his plan. . . . But as vague and general as was his political sermon to youth, it was sufficiently specific when dealing with the unemployment problem to indicate that he contemplates attempting restoration of the Blue Eagle in some form. . . . This was certainly the universal interpretation of his remarks. . . .

In an evident tone of resentment against industry for not absorbing the unemployed, the President virtually warned that, unless it gives jobs to those between the ages of 18 and 65, the Federal Government will take the situation in hand. . . . He also sug-

gested a nebulous formula providing for curtailment of hours of work without change in pay. . . . Entirely devoid of a constructive analysis of the problem, the speech did not state just how, by legislation or otherwise, industry can be made to do the impossible. . . .

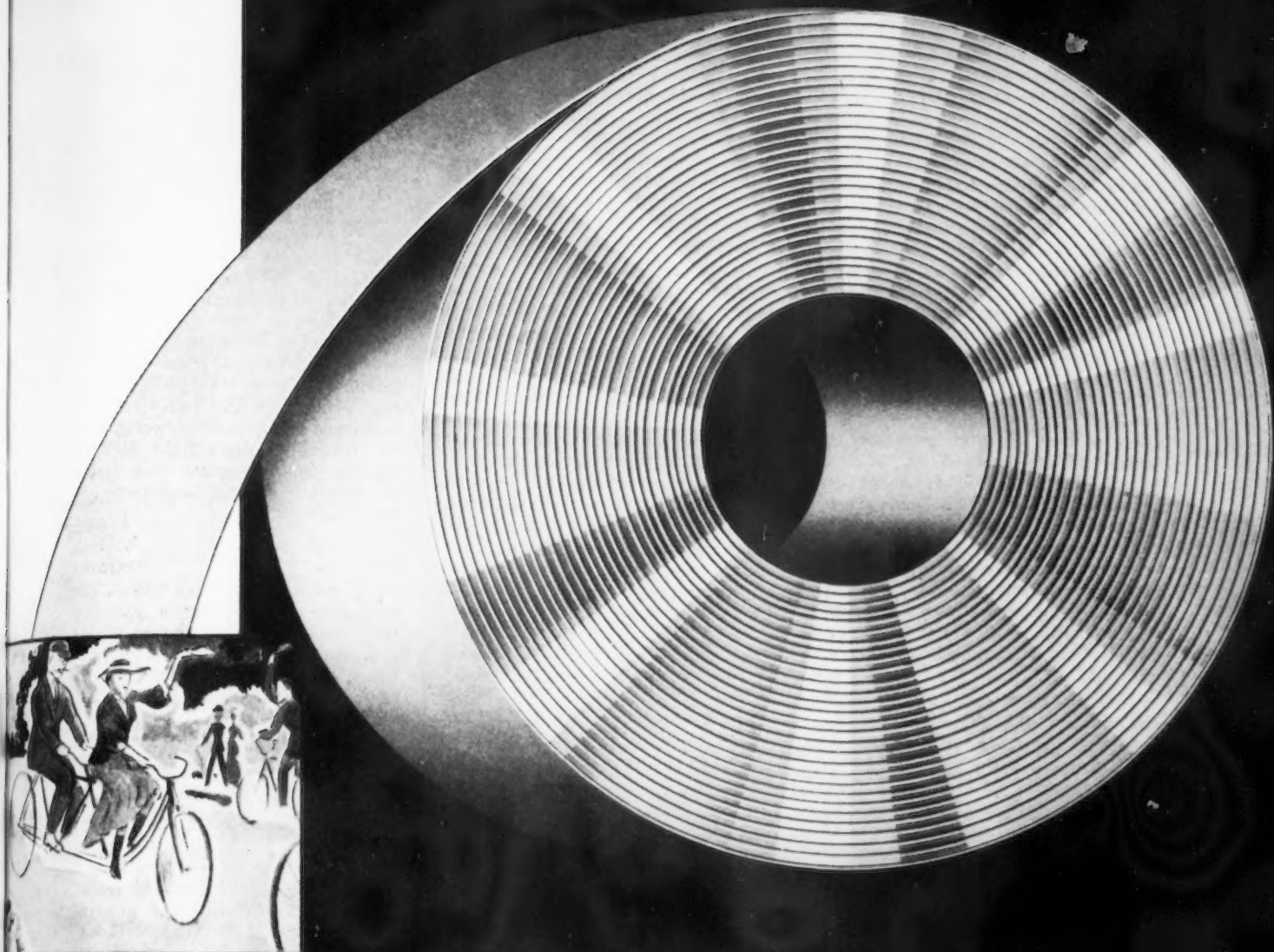
There is a well established conviction that private industry could absorb many of the unemployed, and at decent wages and hours, if the Government would lift its heavy hand; if it would provide adequate tariff protection, where needed; if it would stop tremendous expenditures for relief politics, boondoggling, experimentation, and if it would cease its attacks on business and industry and pay less heed to political expediency and class appeal. . . . It might even resort to fair methods of taxation rather than seek to take from industry by taxation the means by which it could absorb unemployed. . . . It might also call a halt to snooping investigations and, to use a National Labor Relations Board phrase, stop "terrorizing American citizens" who are called on the grill for doing nothing more than exercising their constitutional rights. . . .

Just how far private industry could go in absorbing all of the same 12,000,000 unemployed and how many may always have to be dependent on the Government for relief is a question that no one has been able to answer. . . . There is no doubt, however, that if industry were relieved of constant hamstringing by attacks, intolerable taxation, regulations and threats of further regulation and given a chance to proceed legitimately a tremendous dent would be made in the unemployment situation. . . . While the New Deal has never yet been known to admit a mistake, many believe that its attitude toward business is chiefly responsible for unemployment, which is practically as large as it was when the New Deal took office. . . . This is despite the debts and expenditures that have been piled up to previously unheard-of proportions. . . . These things are never mentioned by the New Deal. . . . Its own handiwork is never disclosed unless it is to ballyhoo its supposed blessings. . . . All the faults are those of industry, which, Secretary of the Interior Ickes says, "won't cooperate with the Government." . . .

▼ ▼ ▼

What If NRA Is Revived?

In the event of a revived NRA or something similar to it, even if in some manner, adroit or otherwise, the constitutional hurdles were jumped, what could some of the major industries do that they are not now doing as to employment, wages and hours? . . . The automotive industry is at a peak of employment. . . . So is the steel industry. . . . Both are paying top wages and are on work weeks that average less than 40 hr., the steel average being about 36 hr. . . . Increasing demand will further stimulate employment, but if wages were further increased and hours further shortened the opposite effect would result and unemployment and costs would increase. . . . Steel is just emerg-



CONTINUOUS IMPROVEMENT!

When bicycles were at the height of their popularity in the gay nineties, the West Leechburg Steel Company was starting from scratch in the manufacture of strip steel.

Since that time West Leechburg strip steel followed the path of continuous improvement for 39 years. This applies to the quality of the strip, the technique employed in making it, and the acceptance of West Leechburg strip steel by critical users.

Strip Steel is the only product we make, and to it we devote our entire skill and experience. Deliveries are prompt too. Try West Leechburg for improved strip steel.

WEST LEECHBURG STEEL COMPANY

GENERAL OFFICES: UNION BANK BLDG., PITTSBURGH, PA.

Branch Sales Offices:

NEW YORK • CHICAGO • DETROIT • CLEVELAND • DAYTON
ST. LOUIS • TOLEDO • [Dean Higgins & Co.] • NEWARK
[Edgcomb Steel Corporation] • PHILADELPHIA • [Edgcomb Steel
Company] • TORONTO, ONT. [Jessop Steel Co.] • BUFFALO —
ROCHESTER — SYRACUSE [Brace-Mueller-Huntley, Inc.]

Warehouse: JOS. T. RYERSON & SON



ALL GRADES OF ALLEGHENY STAINLESS IN STRIP FORM

ing comfortably from the red. . . . Is it to be shunted back to the long, dreary days and years of operating losses and its unemployed lines formed once more?

It will be recalled that in NRA days code authorities gathered in Washington and were told to increase wages and shorten hours further. . . . A flat refusal followed because it was an impossible request. . . . And it is predicted that for a like reason industry will find itself unable to comply with the present suggestion for shortening hours, absorbing more of the unemployed and leaving the rate of pay unchanged. . . . The fact is that industry generally is, without the assistance of Government suggestion, still doing its utmost to solve the unemployed problem in so far as it can. . . . The problem, of course, is not entirely that of industry, and even if it were running at full tilt, there would be many unemployed, some because of the Administration's agricultural program of scarcity. . . .

The means of restoring an NRA, in view of the Schechter decision, are not clear, though they may be unimportant by reason of the prevailing contemptuous disregard of constitutional impediments. . . . Seeing that NRA flopped before it was outlawed and seeing also that there was industrial revival immediately after the discredited Blue Eagle had been told to remove its prying beak from industry, it would appear that the New Deal would be only too glad to keep the old bird buried. . . . But the New Deal, with its characteristic attitude toward the multiplicity of experimentation and expeditions of futility, never conceded that the Blue Eagle was a failure, even though within certain New Deal circles are prominent figures whose sub rosa scorn for NRA was well known. . . . Even organized labor, now so loudly clamoring for another NRA, often damned the old bird because it didn't hatch all the emoluments it had demanded. . . .

But the President apparently never has overcome his bitterness over the NRA decision, unanimous though it was, and which, in a long tirade at a White House press conference, he derisively labeled a "horse and buggy" decision. . . .

So it seems, Supreme Court or no Supreme Court, the New Deal wants another NRA, either in its original or in revised form. . . . The fact intensifies speculation as to whether curbing of the power of the Supreme Court is in contemplation, something that might well be accomplished if the New

Deal finds that the November election has continued it in power, both in the executive and legislative branches. . . . But it would face a hard fight, even at that, for there is a strong sentiment in Congress against NRA within Democratic ranks, and it would no doubt be heightened by growing consumer opposition. . . .

It is assumed that if another NRA is proposed and no curb on the Supreme Court is sought, it will be a revised pattern of the original NRA and be based on the vast volumes of NRA studies made and to be made. . . . Yet these studies do not indicate, in the absence of constitutional amendment, any way to provide for Federal control over wages and hours, which forms the essence of such legislation and which organized labor insistently demands. . . . The studies also frown on price control of anything like the character which would attract most industries. . . . For, obviously, it was price control which brought many of them willingly under the wings of the Blue Eagle, even though they found that such control ceased to function before the Blue Eagle was rendered null and void. . . .

Perhaps an indication of what would be proposed in the way of general NRA legislation is to be seen in the bill of Representative Henry Ellenbogen, Democrat, of Pennsylvania, to set up a "little NRA" for the textile industry, a measure that is being strongly opposed by the industry and just as strongly pressed by organized labor. . . . Among its ardent backers is Representative William P. Connery, Democrat, of Massachusetts, one of the authors of the 30-hr. week bill. . . . Insisting he wants the bill enacted at the present session, Mr. Ellenbogen has announced he will head a delegation to confer with the President and ask that it be placed on the President's "must list" for action before Congress adjourns. . . . Mr. Connery has said he will ask the House Committee on Rules to get the measure on the House floor at once. . . . While revised considerably, the bill carries provisions which opponents say are clearly in conflict with the Schechter decision. . . . Certain clauses seek to establish its constitutionality by declaring that textile products and their sale, transportation and distribution throughout the United States are affected with a national public interest. . . . This is to establish the interstate character of the industry, thus making it subject to Federal regulation. . . . The bill takes pains, however, to make different clauses

separable, so that "no provision or any application thereof shall be held invalid because of the invalidity of any other provision." . . . It is further provided that if any provision or regulation is held invalid by reason of insufficient standards, improper delegation of legislative authority, or any interpretation, the National Textile Commission shall transmit such provision or regulation to Congress, together with its recommendations "for the ratification of such regulation by appropriate legislation, or for amendment of such provision." . . . These provisions clearly show that the authors of the bill took into consideration at least a portion of the Supreme Court's NRA decision holding that Congress had failed to delegate specific standards to the President. . . .

However, despite the holding that the Federal Government could not fix hours and wages, the measure provides for a five-day week and 7-hr. day and calls for a board chosen by the President which would be authorized to fix minimum wages and to regulate trade practices and production. . . . As a palliative to meet consumer protest, the measure also would set up a consumers' council with the same power as to the textile industry as the NRA Consumers Council had . . . and the latter was so devoid of power that it was a source of constant jests. . . . In short, this is the general opinion of the Ellenbogen bill, except that it is a sop to organized labor and a medium for controversy. . . . For the textile industry the bill provides for the usual standard trade practices which generally are contained in voluntary trade practice agreements made with the Federal Trade Commission. . . . There is no price control provision, aside from the usual one prohibiting price discrimination. . . . The latter is a highly debatable point, as reflected in the so-called anti-chain store legislation now pending. . . .

As to the constitutionality of the Ellenbogen bill, it is pointed out that it will not be worth the paper it is written on if the Supreme Court should hold another "little NRA" unconstitutional. . . . This has reference to the Guffey coal act, on the constitutionality of which the Supreme Court is expected to pass at an early date, possibly next Monday. . . . It has been pointed out that if the Court should hold the wage and hour provisions in this measure to be unconstitutional, such provisions certainly would be unconstitutional for the textile industry or any other industry. . . . Even if the Guffey coal act were held consti-

tutional it would not necessarily follow that such provisions would be so held as to a manufacturing industry, inasmuch as a distinction might well be drawn between a raw resource and a manufacturing industry. . . .

Returning to the unemployment problem, it is believed that the general solution suggested by the President—shorter hours with no change in rates of pay and a restored NRA in some form—will be explained in greater detail by Secretary of Commerce Daniel C. Roper when he addresses the convention of the Chamber of Commerce of the United States next week. . . .

Federal Trade Commission Moves Against Auto Parts Makers

Two complaints, largely involving similar charges, have been issued by the Federal Trade Commission against makers and jobbers of automobile parts and accessories, representing most of the business of manufacturing and jobbing of these products throughout the country. Both complaints allege violation of Section 5 of the Federal Trade Commission Act, which relates to unfair methods of competition. The complaints are directed against the Motor and Equipment Wholesale Association and the National Standards Parts Association, both with offices in Chicago.

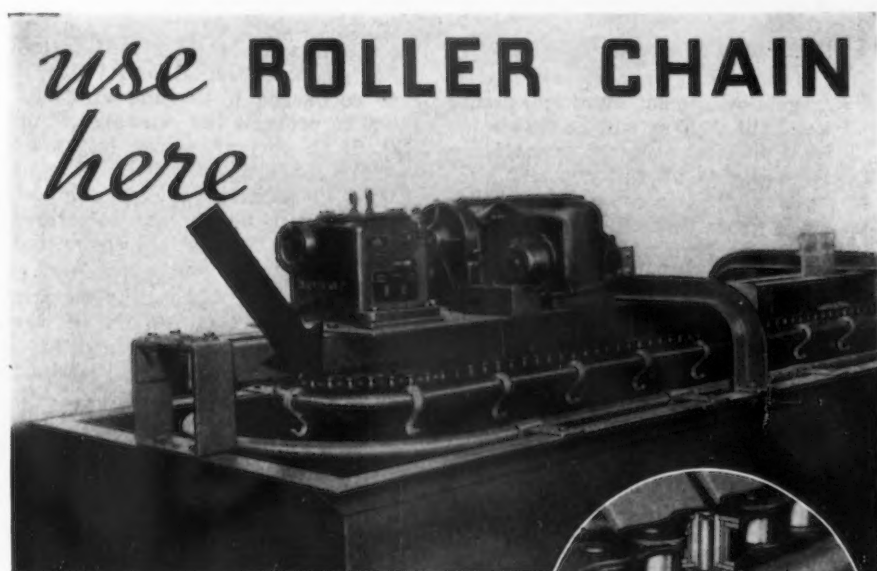
The complaint against the Motor and Equipment Wholesale Association charges unfair competition and restraint of trade in the jobbing of automobile parts and accessories. The complaint against the National Standards Parts Association charges the fixing and maintenance of uniform prices for the purpose of controlling the market in the sale of automobile parts and accessories. In both cases the commission fixed May 22 as the final date for answer showing why an order to cease and desist from the alleged practices should not be issued.

The two complaints carry 35 duplications of names of manufacturers, some of them the most prominent in the United States. They also include affiliated associations of the two major associations against whom the complaints are directed. The complaint against the Motor and Equipment Wholesale Association includes 42 member companies, and that against the National Standards Parts Association includes 57 member companies located in 34 States engaged in either the manufacture or jobbing of automobile parts and accessories.

The complaint against the National Standards Parts Association and its members charges that in 1926 they entered into various agreements, "still in effect, among themselves and with others concerting with them, to control the price of automobile parts and accessories, to eliminate price competition, and to prevent new and additional competition." It is alleged manufacturers fix uniform and substantially identical prices to jobbers, as well as uniform and substantially identical resale prices, that they do not change prices without prior notice to other manufacturers and that jobber members of the association abide by the so-called uniform resale price schedules fixed by manufacturers.

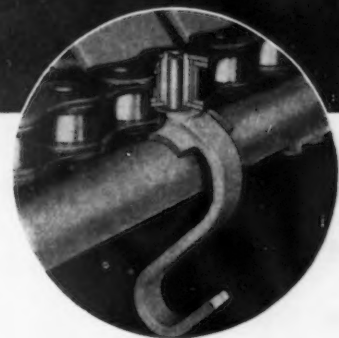
The complaint says association members have attempted to monopolize the distribution of the products in the hands of jobbers designated by them as "legitimate" jobbers, who agree to maintain the resale prices and "have eliminated competition by reducing the number of jobbers by requiring them to carry in stock a certain number of major lines of products, so that they may be classified as 'legitimate' jobbers." This practice, it is alleged, makes it difficult for many small jobbers to survive.

Both complaints charge that jobber members of the associations and non-jobber members joining with them have boycotted manufacturers who do not follow practices approved by the former, and



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THE IRON AGE, April 23, 1936—61

concern such matters as discount and resale price maintenance.

Recommends Government Ownership of Munitions Plants

In a 300-page report to the Senate Monday, the majority of the Nye Munitions Committee urged Government ownership of munitions plants to supply the War and Navy departments, while a minority, opposing such ownership, recommended "rigid and conclusive munitions control." Complete nationalization was declared to be undesirable. The majority report was signed by Senators Nye, chairman, Republican, of North Dakota; Clark, Democrat, of Missouri; Pope, Democrat, of Idaho, and Bone, Democrat, of Washington. The minority report was signed by Senators George, Democrat, of Georgia; Vandenberg, Republican, of Michigan, and Barbour, Republican, of New Jersey.

The minority report said that if large Government munitions plants are built, "there will be inevitable local political pressure to maintain these plants at full capacity production regardless of actual defense needs and the result will be to encourage armament rather than disarmament."

The minority report declared "that if all production be thus concentrated in Government plants there will be no adequate corollary reliance through private manufacture in the event of a war emergency unless the nationalized facilities are maintained at a need-

lessly extravagant and dangerous rate during peace time."

The Government would build all its warships, and an armor plate plant, and produce all its forgings, projectiles, powder, rifles, machine guns, and pistols if recommendations of the majority were to prevail.

Lewis Makes Offer To Amalgamated for Steel Unionization

Directly approaching the Amalgamated Association of Iron, Steel and Tin Workers, the Committee for Industrial Organization, headed by John L. Lewis, has formally offered to cooperate with the Amalgamated Association in a campaign to unionize the steel industry along vertical lines. Hitherto holding itself aloof from the Amalgamated association because it was claimed it was not aggressive enough in efforts to unionize the steel industry, the committee now has proposed an alliance with it to be backed by a fund of \$500,000 to promote the campaign. The C. I. O. was organized last year and is made up of unions affiliated with the American Federation of Labor but has threatened a serious rift in the Federation, committed to a craft union policy.

The C. I. O. representatives and President William Green of the A. F. of L., have indulged in a number of sharp rows in which Green has charged the C. I. O. threatens disruption of the A. F. of L. The Amalgamated Association also is a member of the A. F.

of L., and has closely cooperated with it in the movement to unionize the steel industry. The C. I. O. offer, the acceptance of which would clearly draw the Amalgamated association from its present relationship with the A. F. of L., has therefore caused speculation as to whether a complete cleavage will take place in the ranks of the A. F. of L. Though the Amalgamated association now is considered an industrial union its small membership is still largely made up of craft unionists. It was originally organized as a craft union, and its policies continue to be directed largely along craft union lines under the leadership of its president, M. F. Tighe of Pittsburgh.

According to a statement given out jointly with the letter by Mr. Lewis, the C. I. O. reached its decision to approach the Amalgamated association at a meeting of the full committee in Washington, April 14. The proposal was thereupon, it was stated, discussed with Mr. Tighe and other officers of the Amalgamated association before being made public. Mr. Tighe, it was declared, assured the representatives of the C. I. O. that its offer would be referred to the next meeting of his international executive board and would probably be acted upon at the convention of the Amalgamated association in Canonsburg, Pa., April 28.

The offer of the C. I. O. to raise \$500,000 to aid in conducting the campaign to unionize the steel industry along industrial lines was a restatement of a like offer made by the C. I. O. in a letter of Feb. 21, 1936, to President Green of the American Federation of Labor.

The C. I. O. makes a joint campaign contingent on assurance that all steel workers will have the right to remain united in one industrial union, though it says this "means that the industrial jurisdiction of the Amalgamated association must be respected and the members organized must be protected against future division because of jurisdiction claims of craft unions." It further requires that leadership of the campaign "must be such as to inspire confidence of success, and unions contributing to the campaign should be represented in its direction." To this end the C. I. O. proposes that a joint committee be established, on which the Amalgamated association will be represented, as well as the C. I. O., and other unions willing to contribute to a joint campaign. This committee "would select a responsible and energetic purpose, in which all members of the committee would have confidence, to direct the ac-

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tual organizing work." These offers had been previously made to Mr. Green.

In the event the Canonsburg convention approved the general principles proposed, the C. I. O. said it "may leave further details as to the nature of the campaign to the joint committee." It said, however, it would "expect the convention to clear the way for the campaign by action that will give the organizing committee a reasonably free hand in regard to taking independent and company unions as a body, keeping initiations and dues low enough to meet requirements of a mass campaign, and in other similar respects."

Anti-Basing Point Legislation Not Likely

Indications that there will be no anti-basing point legislation at the present session of Congress have been further emphasized by the action of leaders in Congress in clearing the way for major Administration "must" measures, including those relating to taxes, work relief and departmental appropriations. It is the definite purpose of these leaders that Congress shall adjourn not later than the first week in June, shortly prior to the national conventions. The Republican convention will meet June 3 in Cleveland and the Democratic convention, in Philadelphia, June 23.

It is believed that Congress will have its hands full if it disposes of tax, relief and departmental appropriation legislation by the time now set for adjournment. Action on other important legislation is considered improbable. Even if anti-basing point legislation has the necessary support in Congress, which straw votes indicate is not present, it is not thought it could be enacted at the present session. It would be bound to be the object of considerable debate, it is contended, and inasmuch as this likely would interfere with action on the "must" bills, it is not expected to receive any serious consideration.

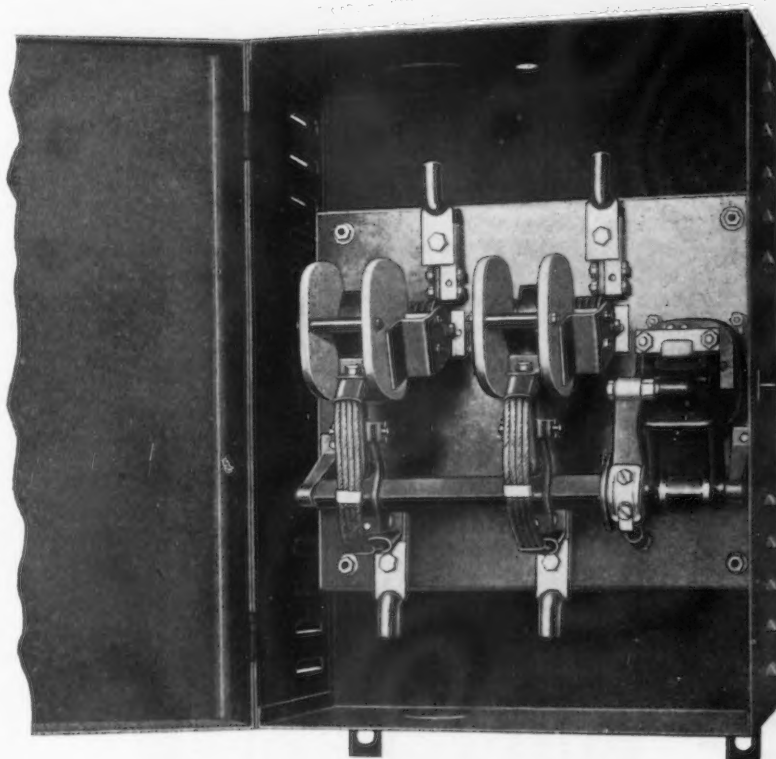
The legislation appears in two measures. One is the Wheeler-Utterback bill, devoted exclusively to the proposed elimination of the basing point system. The bill is still before the Senate Committee on Interstate Commerce, headed by Senator Wheeler, Democrat, of Montana, one of the authors of the bill. Hearings on the bill, it is reported, will be resumed the latter part of the present week, or early next week. It is not known when the hearings will be finally concluded. Among additional witnesses to be heard are those from the cement and lumber industries.

Senator Wheeler has said he has no plans for calling any more witnesses from the steel industry before the committee. In any event, however, it is believed that the hearings will be prolonged to a point where the time of adjournment will be too near at hand to get action on the measure at the present session, even if it is reported out of the committee.

The Patman-Robinson price discrimination bill, which supporters are strongly pressing, carries a

so-called anti-basing point provision. But there are reports that this provision will be used as a trading point to gain support of the chief purpose of the measure and that therefore the anti-basing point clause is only an incidental feature of the Patman-Robinson bill whose supporters are willing to eliminate in return for additional votes for the measure, leaving anti-basing point legislation to the group supporting the Wheeler-Utterback bill.

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PERSONALS

I. LAMONT HUGHES, executive vice-president, Carnegie-Illinois Steel Corp., has resigned effective April 30. He has been associated



I. LAMONT HUGHES

with the Carnegie company or its allied interests for more than 38 years. He was born at Mercer, Pa., in 1878, and attended school at Mercer, New Castle and North Braddock, Pa. He began his ca-

reer in the engineering department at Edgar Thomson works, Carnegie Steel Co., in September, 1897. In 1901 he was placed in charge of engineering for Union Steel Co., Donora, Pa., and in 1905 went to Youngstown as master mechanic of the bar mills of the Youngstown district plants of the Carnegie company. In 1906 he was made assistant general superintendent of the Youngstown district bar mills, and five years later became general superintendent of these mills. In January, 1916, he was made assistant general superintendent of the entire Youngstown district for Carnegie, which at that time was constructing its new bar mills at McDonald, Ohio. Six months later he went to Ojibway, Ontario, as general superintendent in charge of the Canadian Steel company's construction project at that point, but was transferred back to Pittsburgh two years later to assume charge of operations being carried on by the Steel corporation on Neville Island in the construction of an ordnance plant. At the close of the War he was made president of Lorain Steel Co., Johnstown, Pa., and on Jan. 1, 1920, became general superintendent of the Youngstown district for the Carnegie company. He was made vice-president of the company in January, 1925, and in April, 1928, he went to New York as vice-president of the Steel corporation in charge of operations, and as assistant to JAMES A. FARRELL. Mr. Hughes was elected president of the Carnegie Steel Co.

in September, 1930, succeeding WILLIAM G. CLYDE. When the Carnegie Steel Co. and Illinois Steel Co. were consolidated in September, 1935, Mr. Hughes became executive vice-president and a director of the new corporation.

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CHARLES PAESCHKE, JR., vice-president and secretary of the Geuder, Paeschke & Frey Co., Milwaukee, has been elected president of the company to succeed FRANK J. FREY, SR., who becomes chairman of the board. FRANK J. FREY, JR., has been elected executive vice-president and treasurer; HENRY V. MILLMANN, vice-president in charge of production; CARL H. VOSS, vice-president in charge of sales; JOHN F. HARMON, secretary, and A. J. CHAMBERLAIN, manager of the steel package division.

♦ ♦ ♦

GEORGE A. SMART, tool engineer, Allis-Chalmers Mfg. Co., Milwaukee, has been elected chairman of the newly organized Milwaukee chapter of the American Society of Tool Engineers.

♦ ♦ ♦

GEORGE W. BURRELL, president, Wellman Engineering Co., Cleveland, has been elected president of the Cleveland Chamber of Commerce. CHARLES J. STILWELL, vice-president, Warner & Swasey Co., FREDERICK C. CRAWFORD, president, Thompson Products, Inc., and Lincoln R. Scafe, general manager, Fisher Body Co., Cleveland Division, have been elected to the new board of directors, and Mr. Scafe has been named as vice-president.

♦ ♦ ♦

C. B. BOYNE, who has been associated with the Ludlum Steel Co., Watervliet, N. Y., in various capacities since 1914, including that of assistant to the president, has been appointed manager of stainless steel sales. Although continuing to assist in the sales of other Ludlum products, Mr. Boyne's special responsibility will be in the promotion and sale of the company's several lines of stainless steels.

♦ ♦ ♦

L. S. ROEHM, of the Detroit office of the Jones & Laughlin Steel Corp., has been elected president of the Detroit chapter of the American Steel Warehouse Association, Inc. H. B. RENO, of Edgar T. Ward's Sons Co., has been made secretary, and A. N. KOCH, Steel Plate & Shape Corp. was named to represent the chapter as a director on the national board.

♦ ♦ ♦

NOAH A. STANCLIFFE has been elected a director and J. HOMER PLATTEN has been appointed a



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member of the executive committee of the J. G. Brill Co., Philadelphia. The following officers have been elected: President, **CHARLES J. HARDY**; executive vice-president, **LESLIE E. HESS**; vice-presidents, **CHARLES O. GUERNSEY** and **J. HOMER PLATTEN**; secretary and treasurer, **EDMUND L. OERTER**; and comptroller, **B. D. F. BAIRD**.

WALTER E. HAWKINSON, since 1926 assistant manager of the tractor division and prior to that for 15 years in the treasurer's department of the Allis-Chalmers Mfg. Co., Milwaukee, has been elected treasurer, succeeding the late Raymond Dill.

GEORGE E. OLMSTEAD, of New Haven, who has been operating as a manufacturer's agent in Connecticut, has joined the New York sales staff of the Morse Chain Co., Ithaca, N. Y. He will continue to cover Connecticut from New Haven.

THOMAS I. PARKINSON, president of the Equitable Life Assurance Society of the United States, has been elected a director of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

PERCY M. BROTHERHOOD, executive head of Percy M. Brotherhood & Son, New York, machine tool distributor, is in the Broad Street Hospital, New York, with a leg injury suffered when he was struck by an automobile on April 14. He has been engaged in the distribution of machine tools for many years.

E. H. JESSOP, formerly identified with the Morse Chain Co., Ithaca, N. Y., has been added to the sales staff of the Tranter Mfg. Co., Pittsburgh, in charge of Morse chain sales.

E. R. NORRIS, assistant to general works manager, Westinghouse Electric & Mfg. Co., East Pittsburgh, retired on April 1, after 44 years continuous service with the Westinghouse company in the manufacturing and equipment phase of the business. Mr. Norris is well known to the machine tool industry. He is a recognized authority on factory costs and manufacturing equipment.

CLARENCE G. STOLL, vice-president of Western Electric Co., has been elected a director of Electrical Research Products, Inc., and **WHITFORD DRAKE** has been elected executive vice-president of the company.

JOHN H. MOHR, John Mohr & Sons, Chicago, has been elected president of the Purchasing Agents Association of Chicago. Other officers elected are: First vice-president, **R. W. MORRILL**, Bowman Dairy Co.; second vice-president, **G. R. ZEISS**, the Wahl Co.; treasurer, **G. W. SIMONS**, Darling & Co. and secretary, **F. J. HEASLIP**, Fairbanks, Morse & Co. Elected to the board of governors were **L. H. SCHREIBER**, Allen B. Wrisley Co.; **T. H. TREDWELL**, W. C. Ritchie Co.; **M. T. HARTIGAN**, Joseph T.

Ryerson & Son, Inc.; and **E. W. FITZGERALD**, Wepsco Steel Products Co.

GEORGE A. GUNN, 444 Market Street, has established himself at San Francisco as an independent broker in steel castings and forgings. His first connection with the industry was with the Union Iron Works in 1901. Later he was associated with the Columbia Steel Corp. at Portland, Ore., then with Best Steel Casting Co. and until 1935 with General Metals Corp.

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OBITUARY

JAY I. ANDREWS, who retired in January, 1935, as vice-president and general manager of sales, American Sheet & Tin Plate Co., died suddenly at Atlantic City on April 16, aged 67 years. He had



JAY I. ANDREWS

been identified with the company since its organization in 1904, and with the steel industry, except for a few years spent in the meat packing industry, since 1889 when he entered the employ of the Illi-

nois Steel Co. Mr. Andrews was born in Lakeland, Minn., Feb. 14, 1869, and received his education in the grade and high schools of Hudson, Wis., and at Macalester College, St. Paul. He was with the Illinois Steel Co. for three years, first in the company's general offices at Chicago and later at its Union and South Chicago works. He returned to the steel business in 1900 with the American Sheet Steel Co. in its general offices at New York. In 1904 the American Sheet Steel Co. and the American Tin Plate Co. were merged into the present American Sheet & Tin Plate Co., and the general offices transferred from New York to Pittsburgh. On Oct. 1, 1905, Mr. Andrews was appointed assistant general manager of sales of the combined companies and on Jan. 1, 1909, was appointed general manager of sales. In April, 1926, he was made vice-president.

WILLIAM G. GRIFFITH, for many years connected with the National Malleable & Steel Casting Co., died at St. Petersburg, Fla., April 14, aged 85 years. His earlier service with the company was at Cleveland, Ohio; then for 25 years and up to his retirement he was superintendent of the plant at Indianapolis, Ind.

JAMES E. SCHALL, for many years general manager of the New Haven Iron & Steel Works, Fair Haven, Conn., died at West Haven,

Conn., on April 4, aged 77 years. He was well known in the old puddle mill trade through Pennsylvania, as from the time he was 16 years old until 1899 he was connected with the old Susquehanna Iron Co., Columbia, Pa., in various positions until his death.

♦ ♦ ♦

ELWOOD THOMAS ICKES, a director of Columbia Steel & Shafting Co., Carnegie, Pa., died on April 17. He was born at Germantown, Pa., in 1877 and attended the University of Pennsylvania. He began his career in metallurgical engineering work with the Carnegie Steel Co., but left that company in 1916 to become engineer of tests for the Midvale Steel & Ordnance Co. at the Worth plant, Coatesville, Pa. In 1917 he returned to Pittsburgh to become associated with Columbia Steel & Shafting Co. as metallurgical engineer in charge of all metallurgical and development work. Mr. Ickes was a member of the Society of Automotive Engineers, Society for Testing Materials and the American Society for Metals. He was widely known for his metallurgical work.

Fluorspar Conference To be Held May 22

NECESSARILY postponed because of the blizzards and heavy snows that paralyzed transportation during the latter part of January, the conference on "New Trends in the Utilization of Fluorspar," originally scheduled to be held at Rosiclare, Ill., on Jan. 24, will be held on May 22.

As stated by Dr. M. M. Leighton, chief of the Illinois State Geological Survey Division of the Department of Registration and Education, the purpose of the conference is to reveal to all who are interested in the mining and use of fluorspar the character of researches now in progress, which are expected to bring to light new uses and widen the market field for this mineral, which is extensively used in the steel, aluminum and chemical industries.

The conference at Rosiclare, in the heart of the mining area, will be sponsored jointly by the Illinois State Geological Survey, the United States Geological Survey, and the fluorspar producers of the Illinois-Kentucky district.

The program calls for an afternoon and evening session on the day of the conference, with C. B. Fox, president, Aluminum Ore Co., East St. Louis; and Dean Walter McCourt, vice-chancellor, Washington University, St. Louis, serving as chairman.



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(CONCLUDED FROM PAGE 36)

the time being, because once the steel has been given that heat-treatment it is essential that the structure never again be subjected to a high temperature. A repair on a car fabricated of steel so heat-treated is out of the question because it would reduce the tensile strength 20,000 lb. per sq. in. Conservative engineers, including the promoters of these steels, do not advocate taking advantage of the increase in strength by artificial precipitation hardening.

Another phase of this subject which requires mention is the tendency of the higher copper steels to show surface checking unless suitably protected by means of other additional elements. Nickel seems to be the outstanding element for the protection of steels containing 1 per cent or more of copper, but chromium, manganese and silicon—alone or in combination—have been used effectively to prevent checking in steels containing up to 0.6 per cent copper, such as the well-known Cor-Ten, Cromasil-copper, Cromador, Union Baustahl and Krupp Manganbaustahl types, all of which contain no nickel.

In considering corrosion resistance, phosphorus requires special mention. It is generally agreed that phosphorus increases the corrosion resistance under many service conditions, particularly when used in combination with copper. Generally, chromium is used with the phosphorus to offset some of its other effects. Recently, however, it has been claimed that in the lower carbon steels, phosphorus acts like carbon and carries with it no correlated phenomena which require the presence of chromium for the elimination of these effects.

Ultimate Strength Still Major Criterion


To sum up briefly, ultimate strength would still seem to be the major criterion for steels for lightweight construction, with ductility and insensitivity to welding operations as the prime adjuncts and with improved corrosion resistance as a desirable feature. Various types of alloy steels have been de-

veloped which meet the above-mentioned requirements, and as far as those properties which are usually measured are concerned there is little significant difference between them.

It will remain for service experience and the full evaluation of those properties which are not susceptible to laboratory measurements, to determine the relative worth of each of the steels in ques-

tion. The final choice of any particular one will depend upon the balance of this worth and the economics involved.

The general contract for the foundation of the new Jones & Laughlin Steel Corp. mill has been awarded to J. A. Utley, Detroit, and Merritt, Chapman & Scott Corp., New York. It is expected that the work will begin within the next two weeks.



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Private Shipyards Operated at 50 Per Cent of Capacity in 1935

SHIPBUILDING in private shipyards of the United States which normally construct sea-going vessels increased approximately 20 per cent during 1935. According to the annual report of the National Council of American Shipbuilders, it is estimated that the industry operated at nearly 50 per cent of its normal capacity as compared with 30 per cent during 1934.

Merchant vessels, above 1000 gross tons, under construction at the beginning of 1935 numbered but two, the equivalent of 19,022 gross tons. The two vessels under construction on January 1 were completed during the year, and new contracts placed accordingly totaled 16 vessels, or 111,070 tons, as indicated by work in progress at the year's close. Government vessels, above 1000 displacement tons, under construction in private shipyards at the beginning of 1935 numbered 33 of 140,000 tons. None

of these was completed during the year, but 13 new contracts were added, bringing the number under construction on Dec. 31 to 46 vessels, or 181,450 tons.

Value of unfinished business on new construction in private yards increased from \$119,000,000 at the beginning of the year to \$133,000,000 at the year's close. Naval construction accounted for 90 per cent of the total.

No construction of merchant vessels on the Great Lakes was under way during the year. On the rivers there was considerable activity in barge building during the last six months of the year, although the volume of new construction was below normal.

Referring to the recognized necessity of a regular construction program for the replacement of obsolete American merchant vessels, the report states that such a plan over a 20-year period would

require the annual construction of 300,000 gross tons of vessels for our coastwise and foreign trade. Even on this basis two-thirds of American shipping would still have to be consigned to foreign vessels.

Since the report points out that approximately 40 per cent of the cost of a vessel is expended for labor in allied iron and steel and other industries, the results of putting such a replacement program in operation would beneficially affect innumerable domestic industries.

Republic Acquires Niles Fabricator

REPUBLIC STEEL CORP., through purchase of all the stocks and bonds of Niles Steel Products Co., Niles, Ohio, has acquired sole ownership of that organization, and will operate it as a wholly owned subsidiary. Republic has had a part ownership in the firm for some time. No changes of personnel at the Niles plant are anticipated as a result of the deal. About 450 men are employed.

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Two Steel Companies Show Reduced Earnings But Others Report Gains

FIRST quarter earnings of Otis Steel Co., Cleveland, showed a reduction of \$786,686 from the corresponding quarter a year ago. After depreciation, interest, Federal taxes and other charges, the amount netted in the three-month period ended March 31 was \$148,676, as against \$935,362 in the comparable 1935 quarter. Reduced earnings were attributed to January and February drop in automobile production, as normal first quarter business suffered through advance introduction of new model cars last November. Profit in the first quarter equaled \$1.29 a share on 115,039 shares of 7 per cent cumulative prior preference stock. In the same quarter of 1935 earnings were equivalent, after preferred dividends, to 89c. a share on 841,002 common shares.

Acme Steel Co., Chicago, and subsidiaries earned \$210,137 less in the quarter just ended than in the like period of 1935. Combined net profit was \$391,853 after all deductions, equal to \$1.19 a share on 328,108 capital shares outstanding. In the same quarter last year net profit was \$601,990, or \$1.83 a share. Net profit in 12 months ended March 31 was \$1,560,598, or \$4.75 a share. For 1935 profit was \$1,760,965, equaling \$5.37 a share.

Youngstown Sheet & Tube Co., Youngstown, in the quarter just ended, replaced a loss with a profit. After Federal taxes and charges, \$1,897,299 was netted, equal after preferred dividend provisions to \$1.40 a share on 1,200,000 shares of common stock. This compares with net loss of \$595,769 in the same period last year.

Gulf States Steel Co., Birmingham, approximately tripled earnings in the first quarter as compared with a year ago. Company's net profit was \$96,929 after taxes and charges, compared with \$30,149 earned in the same quarter of 1935. The most recent earnings equaled 31c. a share on 197,500 shares of common stock after provisions for preferred dividends, as against \$1.50 a share on 20,000 shares of preferred stock.

Bethlehem to Control Cooling of Rails

A PROCESS whereby the temperature of the cooling process during steel rail manufacture may be controlled and which results in what may be called "strain-relieved" rails has been announced by the Bethlehem Steel Co. which intends to produce the new type rail almost wholly this year.

The internal stresses to which a rail is subject because the outside of the rail cools more quickly than the inside are said to be largely eliminated by this new plan of temperature control, which consists simply of cooling the rails through temperature ranges, causing strains to be relieved and producing a safer and more reliable rail.

According to the Bethlehem company, "The process is carried out in either of two ways—by placing a number of hot rails in protective boxes in which the cooling is controlled or by placing a series of hot rails in an oven and progressing

them through the oven, controlling the temperature as it is gradually reduced.

"In both methods not only is the cooling rate controlled but the temperature differential between the exterior and interior of the individual rail is substantially reduced.

"From experimentation, investigation and technical research, as well as from actual results in track service the process promises relief from a type of rail failure that has been a source of constant anxiety to both railroads and rail manufacturers."

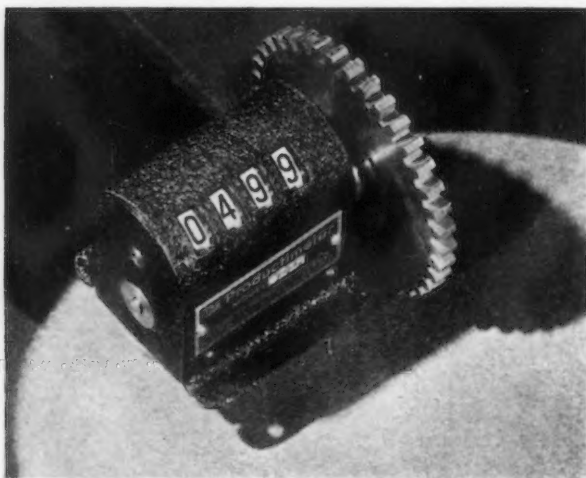
Tests of this new type rail have been under way for the past five years and over 200,000 tons of rails are in service without a single breakage since installation, according to the company.

The Inland Steel Co. and the Colorado Fuel & Iron Co. are licensees and will apply the process to their rails this year also.

General Motors Buys Kokomo Radio Plant

PURCHASE of the factory of the Kokomo division of the Crosley Radio Corp., Kokomo, Ind., by General Motors Corp., effective May 1, has been announced.

The Kokomo plant will be known as the Delco Radio division and will operate as a subsidiary of the Delco-Remy division. It will manufacture automobile radios for General Motors cars. The corporation will continue, however, to purchase a considerable portion of its automobile radio requirements from outside radio manufacturers. Ray C. Ellis, now a member of the engineering staff of General Motors, will be general manager of the new division.



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THE SPEEDOMETERS OF INDUSTRY

Girdler Sees Bright Outlook for Industry if Government Stops Meddling

AMERICAN industry today is staging a comeback which will go far unless blocked by unsound legislation based on the "theories of academic non-producers," T. M. Girdler, chairman and president, Republic Steel Corp., said in an address before the American Zinc Institute, at St. Louis, on April 20.

The real victims of unfair attacks upon business which threaten to cripple the efficiency of industry are millions of workers and investors as well as the consuming public, Mr. Girdler declared.

"The fundamental fallacy in these attacks," he said, "lies in the effort to make a distinction between industry on the one hand and the public on the other. A corporation does not live in a vacuum. It is an aggregation of human beings, of employees, investors and of management.

"Managers of industry have an obligation to defend the property of stockholders and the jobs of employees against measures which would undermine industry and crush enterprise.

"I wonder if those who give ear to the defamers of industry ever stop to think what industry means to this country and what it has contributed to the kind of a standard of living which exists here and nowhere else in the world.

"This is a vast country. To serve its needs and keep in step with the requirements of its growing population it was necessary that business should grow also, striving always for increased efficiency, improved products and lower prices.

"Big depressions always give rise to fantastic economic ideas and theories. We have had a great outcropping of quacks. They all advocate some sort of rearrangement of our economic system.

"The bureaucratic theorists who now presume to supervise American business have never produced the things and goods demanded by American consumers. They cannot, they never have, produced anything. All they do is to tell us how to stop producing. All they do is to tell us to do less than we are doing already."

Commenting on the outlook for the steel industry, Mr. Girdler said:

"Together with all other industries today, we are faced with the problem of how far Government

restrictions upon enterprise and the burden of taxation are to go.

"The plan to tax corporation surpluses is a case in point. This idea seems to have caused great excitement among politicians. They want to tax corporation reserves out of existence. Some inkling of the real character of this proposal is to be seen in the fact that it has received the endorsement of the Communist party in America.

"What would have happened in this country if corporations had possessed no reserves at the start of the depression? I can speak with intimate knowledge only of the steel industry. The existence of reserves enabled the steel industry to carry on through the depression, to maintain its plants, to spend large sums in relief and to sustain a loss over a four-year period of more than \$285,000,000.

"The outlook for the steel industry is particularly bright if the natural forces of recovery now under way are permitted to operate.

"I see a million uses for metals and I see before us a great prosperity. But we and our investors and our workers cannot be prosperous when our chance to do a productive job well and honestly is constantly being hampered by mis-conceived and unfortunately motivated legislation. If they would only give us a chance, there is much we could do to bring real recovery to the United States."

DiVco-Twin Truck Merger Announced

STOCK of the Continental-DiVco Co., which was owned by the Continental Motors Corp., and the assets of the delivery unit division of the Twin Coach Co., have been purchased by financial interests. The companies will be merged.

The consolidation of these two truck companies, both pioneers in the door-to-door delivery field, will greatly enlarge the manufacturing, sales and servicing facilities of the new organization which is now known as the DiVco-Twin Truck Co. Operations will be carried on at 12801 Jefferson Avenue East, Detroit. There will be sales, service, and parts stations in the principal cities in the United States. In Canada, the business will be handled by the DiVco-Twin Truck Co. of Canada, Ltd.



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SPRING COMPANY**
LOGANSPORT, INDIANA



... Lettings in good volume at 20,000 tons, compared with 10,575 tons last week.

o o o

... New projects will require 28,045 tons as against 19,735 tons a week ago.

o o o

... Plate awards call for 3230 tons.

NORTH ATLANTIC STATES

Newton, Mass., 100 tons, Oak Hill school, to Groisser-Schlager Iron Works, Somerville, Mass.

Augusta, Me., 165 tons, dormitory building, Augusta State hospital, to Megquier & Jones Co.

Hinsdale, Mass., 325 tons, reconstruction building, Hinsdale Paper Co., to Bethlehem Fabricators, Inc.

Cranston, R. I., 125 tons, employees' dormitory, State infirmary, to Providence Steel & Iron Co.

New York, 1200 tons, American Radiator Co. building, Fortieth Street, to American Bridge Co.

New York, 800 tons, six bridges for New York Central, to Bethlehem Steel Co.

St. Lawrence County, N. Y., 170 tons, State highway bridge, to Jones & Laughlin Steel Corp.

Syracuse, N. Y., 225 tons, warehouse building for Continental Can Co., to Austin Co.

Marcellus, N. Y., 545 tons, central grade and high school, to Smith & Caffrey Co.

Weehawken, N. J., 755 tons, ventilation building, midtown Hudson tunnel, to Fort Pitt Bridge Works Co.

Wharton, N. J., 130 tons, grade-crossing elimination, to American Bridge Co.

Columbia County, Pa., 275 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Philadelphia, 365 tons, railroad bridge, to American Bridge Co.

Trafford, Pa., 125 tons, bridge repairs, to Pittsburgh Bridge & Iron Co.

Bedford County, Pa., 300 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

Edinboro, Pa., 860 tons, State highway bridge, to Fort Pitt Bridge Works Co.

SOUTH AND SOUTHWEST

Elm Grove, W. Va., 130 tons, trestle and bins, Ohio Valley Coal Co., to Riverside Steel Co.

Radford, Va., 175 tons, State highway bridge over New River, to Virginia Bridge Co.

Decatur, Ala., 1850 tons, transmission towers, for TVA, to American Bridge Co.

Albuquerque, N. M., 840 tons, viaduct, to Bethlehem Steel Co.

Ajo, Ariz., 250 tons, plant extensions, to Kansas City Structural Steel Co.

CENTRAL STATES

Lorain, Ohio, 1200 tons, Black River bridge, to Mount Vernon Bridge Co.

Wooster, Ohio, 100 tons, grandstand, to Fort Pitt Bridge Works Co.

Fostoria, Ohio, 300 tons, mill buildings, to Fort Pitt Bridge Works Co.

Coshocton and Muskingum Counties, Ohio, 165 tons, highway bridge, to Burger Iron Co.

Milwaukee Road, 190 tons, bridge, to Worden-Allen Co.

Detroit, 580 tons, machine shop alterations and additions, Chrysler Corp., to Jones & Laughlin Steel Corp.

Streator, Ill., 370 tons, building for Owens-Illinois Glass Co., to Bethlehem Steel Co.

Chicago, 1200 tons, Stoney Island Avenue subway, to Bethlehem Steel Corp.

South Chicago, 1250 tons, wire mill building for Republic Steel Corp., to Austin Co.

Evanston, Ill., 375 tons, subway for Chicago & North Western, to Bethlehem Steel Co.

Macoupin County, Ill., 240 tons, subway section, to R. C. Mahon Co.

Lake County, Ill., 250 tons, Lake Forest bridge, to Milwaukee Bridge Co.

East St. Louis, Ill., 950 tons, South Valley Junction approach, to Mississippi Valley Structural Steel Co.

Douglas County, Neb., 215 tons, bridge, to Omaha Steel Works.

Knox County, Neb., 125 tons, bridge, to American Bridge Co.

Jackson County, Mo., 700 tons, bridge, to Wisconsin Bridge & Iron Co.

WESTERN STATES

Skagit County, Wash., 250 tons, Swinomish River bridge, to Pacific Car & Foundry Co.

Portland, Ore., 185 tons, State overhead crossing on Columbia River highway, to an unnamed bidder.

Los Angeles, 100 tons, tunnel ribs for Metropolitan Water District, to Bethlehem Steel Co.

Los Angeles, 730 tons, Cajalco dam, to Consolidated Steel Corp.

San Diego, 1160 tons, addition to aircraft plant, to Consolidated Steel Corp.

Pasco, Wash., 230 tons, State highway bridge.

NEW STRUCTURAL STEEL PROJECTS NORTH ATLANTIC STATES

Swanton, Vt., 280 tons, State highway bridge.

Seymour, Conn., 420 tons, State highway.

Sheffield, Mass., 150 tons, bridge.

Amherst, Mass., 100 tons, bridge.

New York, 1500 tons, addition to St. Luke's hospital.

New York, 1500 tons, six bridges for New York Board of Transportation in Queens.

Brooklyn, 12,000 tons, Marine Parkway Authority; bids to be taken in May.

Bingham, N. Y., 1000 tons, school; bids May 4.

Syracuse, N. Y., 600 tons, medical college building for Syracuse University; bids April 29.

Broome County, N. Y., 400 tons, State highway bridge; bids April 21.

Schuylkill and Tioga Counties, Pa., 900 tons, two highway bridges; bids May 1.

Baltimore, 300 tons, addition to Federal Land Bank Building.

Washington, 650 tons, Bennings viaduct over Baltimore & Ohio and Pennsylvania Railroads.

CENTRAL STATES

Cleveland, 750 tons, plates and shapes, for rebuilding blast furnace of Republic Steel Corp.

Cleveland, 300 tons, Triskett Road bridge, for State Highway Department; bids May 5.

Cleveland, 400 tons, Lakewood exchange for Ohio Bell Telephone Co.

Bedford, Ohio, 750 tons, grade-crossing elimination; McHugh Co., low bidder.

Bowling Green, Ohio, 160 tons, highway garage; bids April 27.

Toledo, Ohio, 200 tons, building for City Auto Stamping Co.

Mansfield, Ohio, tonnage unstated, warehouse for Westinghouse Electric & Mfg. Co.

Coshocton, Ohio, 125 tons, building for Muskingum Fiber Products Corp.; Edward Jacobs, contractor.

Batavia, Ill., 425 tons, Campana Sales Co.

Ann Arbor, Mich., 800 tons, building for Rackham school, University of Michigan.

Gladstone and Negaunee, Mich., 610 tons, State highway bridges.

Joliet, Ill., 1000 tons, grade-crossing elimination.

Chicago, 15,000 tons, Outer Drive bridge; to be readvertised in five sections.

Fargo, N. D., 850 tons, bridge.

West Allis, Wis., 140 tons, Fourth Street subway for Milwaukee Road.

Jackson County, Wis., 110 tons, bridge No. 233; bids April 28.

Waukesha, Wis., 100 tons, high school addition; Robert L. Reisinger & Co., Milwaukee, general contractor.

State of Kansas, 300 tons, highway bridge in Bourton County.

Kansas City, Mo., 1500 tons, Fiftieth and Sixty-third Street viaducts; List Construction Co., Kansas City, and M. E. Gilloiz, Monnet, Mo., low bidders on general contract.

(CONCLUDED ON PAGE 83)

Gear Makers Hold Twentieth Annual Meeting in Philadelphia

UNUSUALLY large attendance, as well as a comprehensive program of technical and commercial topics, featured the 20th annual meeting of the American Gear Manufacturers Association, held at the Hotel Adelphia, Philadelphia, April 20 and 21.

Election of officers resulted in the naming of E. S. Sawtelle, vice-president of the Tool Steel Gear & Pinion Co., Cincinnati, president, and H. H. Kerr, president, Boston Gear Works, Inc., Quincy, Mass., vice-president. J. Harper Jackson, Pittsburgh Gear & Machine Co., is treasurer, and J. C. McQuiston, Penn-Lincoln Hotel, Wilkinsburg, Pa., is manager-secretary.

Four new members of the association's executive committee are: J. H. Flagg, Watson-Flagg Machine Co., Paterson, N. J.; F. H. Fowles, Foote Brothers Gear & Machine Co., Chicago; C. F. Goedke, Ganschow Gear Co., Chicago, and W. G. Jones, W. A. Jones Foundry & Machine Co., Chicago.

"Old Timers' Night"

An informal dinner, with G. L. Markland, Jr., chairman of the board, Philadelphia Gear Works, as toastmaster, was devoted to commemoration of the founding of the association at Lakewood, N. J., in 1916. Speakers included John Christensen, president, Cincinnati Gear Co.; V. S. Beam, S. L. Nicholson and L. R. Botsai of the Westinghouse Electric & Mfg. Co.; E. W. Miller, chief engineer, Fellows Gear Shaper Co.; A. A. Ross, engineer, General Electric Co., and retiring president of the A.G.M.A.; F. H. Rea, president, Pittsburgh Gear & Machine Co.; and B. F. Wakeman, engineer, Brown & Sharpe Mfg. Co., and honorary president of the association.

Variety of Papers and Addresses

Features of the opening session, on the morning of April 20, included an interesting discussion of "Industry's Place in the Events of Today," by John W. O'Leary, president, Machinery and Allied Products Institute, and an address on "What's Ahead In Sales," by F. B. Heitkamp, American Type Founders Corp. Mr. Heitkamp said that general business was definitely better, with the near-future outlook equally promising. He emphasized the necessity of sales planning and discussed trends in the

technique of such planning, including the use of sales budgets.

Comprehensive Technical Program

Progress was reported by a number of the technical subcommittees of the A.G.M.A. general standardization committee, which is headed by T. R. Rideout, Nuthall works of the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Technical papers included a general discussion of "Gear Noise—Causes and Corrections," by W. E. Sykes, Farrel - Birmingham Co., which is to form the nucleus of a number of future papers dealing with particular aspects of the problem.

Other technical papers were: "Marine Gearing," by Ira Short, engineer, South Philadelphia works, Westinghouse Electric & Mfg. Co.; "Cast Steel and Welded Plate Combination Gear Housings," by Everett Chapman, vice-presi-

dent, Lukenweld, Inc.; "Hobs and Hobbing," by S. M. Ransome, Barber-Colman Co.; "Use of Tapered Roller Bearings in Gear Reduction Units," by S. M. Weckstein, Timken Roller Bearing Co.; and "Standard Procedure in Determining the Size and Horsepower Capacities of Gears of Different Materials," by G. E. Katzenmeyer, National-Erie Corp.

"Gear Cost Estimating" was discussed in a paper by G. R. Holbrook, Charles E. Crofoot Gear Corp., and "A Purchasing Agent's View of the Gear Salesman," by Donald G. Clark, Brown & Sharpe Mfg. Co., was one of the feature addresses at the closing session.

The Carl Mayer Corporation, Cleveland, has been organized to manufacture a complete line of industrial ovens and drawing and tempering furnaces. Carl Mayer is president and C. A. Vining, vice-president. Mr. Mayer previously was connected with the Smith-Mayer Corp., Cleveland, builder of industrial furnaces and ovens, which has been dissolved. The Mayer Corporation is located at 3030 Euclid Avenue.



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CHICAGO



...No sign of recession seen in British steel boom.

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...Price increase considered inopportune due to political tension.

LONDON, April 20 (By Cable).—

The pig iron scarcity continues. New sales of foundry iron will be impossible for some months and higher prices are almost certain when business is resumed. Hematite prices have been stabilized up to the end of July but an increase is then likely. A coke shortage is still impeding relighting of additional furnaces. The high activity of the steel trade production has been fully absorbed and stocks are low. The March output of steel ingots and castings is 980,100 tons, the highest on record. Despite increased production of bars and billets large imports are necessary. A heavy volume of specifications for ship building, structural and railway steel has been reported. Sheet makers are busier mainly owing to home orders but exports

are better. Numerous orders have been booked for new ships.

Tin plate is quiet with bookings below current production. Export business is rather disappointing.

Continental iron and steel is still quiet but signs of revival are apparent. Bars and sections are dull but United Kingdom is buying semi-finished steel and business is better with India and the Near East in miscellaneous products. The international steel cartel meeting in view of the general political situation considered the time inopportune for a general price advance which is being urged by many.

March exports of pig iron were 6670 tons, none being shipped to United States. Total exports of iron and steel were 163,400 tons.



... Awards of 7150 tons —10,710 tons in new projects.

AWARDS

Rochester, N. Y., 1600 tons, additional buildings for Eastman Kodak Co., to Genesee Bridge Works.

Covington, Ky., 750 tons, remodeling city waterworks, to Pollak Steel Co.

Cincinnati, 1300 tons, waterworks improvement, to West Virginia Rail Co.

Cincinnati, 600 tons, waterworks improvement, to Joseph T. Ryerson & Son, Inc.

Peoria, Ill., 250 tons, Federal warehouse, to Bethlehem Steel Co.

Palmroy, Kan., 150 tons, dam, to Concrete Steel Co.

Chicago, 200 tons, Sanitary District work, to Joseph T. Ryerson & Son, Inc.

Lake County, Ill., 375 tons, bridge, to Calumet Steel Co.

Hayward, Wis., 200 tons, two underpasses for Soo Line Railway, to Bethlehem Steel Co.

St. Louis, 200 tons, building for St. Louis Dairy Co., to Laclede Steel Co.

West Los Angeles, 410 tons, property building for Twentieth Century-Fox Film Corp., to Truscon Steel Co.

Los Angeles, 602 tons, material for Treasury Department under Invitation No. 8035, to Truscon Steel Co.

El Paso County, Colo., 100 tons, State bridge south of Colorado Springs, to an unnamed bidder.

Spokane County, Wash., 260 tons, State overhead crossing near Parkwater, to an unnamed bidder.

State of Montana, 154 tons, bridges in three counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Sharon, Mass., 130 tons, grade crossing elimination.

Brooklyn, 1000 tons, Marine Parkway Authority; bids to be taken in May.

Cincinnati, 900 tons, waterworks improvement.

State of Illinois, 500 tons, road work.

State of Wisconsin, 500 tons, road work.

State of Indiana, 800 tons, road work; bids April 27.

Des Plaines, Ill., 200 tons, pump house and reservoir; R. C. Wieboldt & Co., general contractor.

Chicago, 200 tons, building for Dole Valve Co.

Waukesha, Wis., 150 tons, high school addition; Robert L. Reisinger & Co., Milwaukee, general contractor.

Fort Peck, Mont., 3000 tons, tunnel outlet and main control shafts; bids April 30 at Kansas City office of United States Engineers.

San Francisco, 110 tons, material for Treasury Department under Invitation No. 1417; bids opened.

Denver, 240 tons, Ralston Creek dam, outlet works and spillway; bids May 12.

Pearl Harbor, T. H., 470 tons, extension to quay wall; only bid received was rejected.

Los Angeles, 120 tons, addition to Sears, Roebuck & Co. store on Olympic Boulevard; bids soon.

West Los Angeles, 1000 tons, two sound stages or Twentieth Century-Fox Film Corp.; plans being completed.

Placentia, Cal., 100 tons, Bradford school auditorium; bids soon.

Salem, Ore., 250 tons, reservoir; bids May 1.

Fort Peck, Mont., 540 tons, emergency gate shafts for tunnels; bids May 21.

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... Low prices for German steel persist.

HAMBURG, April 4. (By Special Correspondence.)—The British wire industry and the International Wire Cartel have signed an agreement whereby the cartel will be allowed to import 20,000 tons into England in 1936 and 17,000 tons annually for the next five years. British wire export prices have been advanced 10s. to 15s. a ton and markets overseas have been distributed between both groups so that competition has come to an end. Now that Sweden is in the cartel and Italy has ceased exporting, the whole European industry belongs to the organization, with the Australian and South African industries included as associate members. Negotiations have now been started with Canada to limit Canadian wire nail competition on the British market.

Total production of non-ferrous metal ores in Germany in 1935 was 113,280 tons compared with 71,886 tons in 1934. Iron mining was undertaken again last year in 11 different sections of Germany where it was abandoned during the nineteenth century. In spite of low world prices, mining has again become profitable because of better methods of extraction.

Exports of agricultural implements increased from 16,986 tons in 1934 to 24,086 tons in 1935 and so far in 1936 a 20 to 25 per cent increase has been reported. Demand for all agricultural implements and machinery is satisfactory in almost all export markets.

The Bayrische Aluminiumwerke plans to increase production of aluminum to 20,000 tons annually. Last year only 5200 tons was made and no production in 1934.

The German motor car industry reports a 77 per cent increase in production last year compared with 1934, and an even higher rate is anticipated for this year. The increase of 110 per cent in export sales last year is attributed to the success of German cars in international motor car races. All European and African races but one were won by German cars in 1935.

When the United Steel Works, Germany's largest steel maker, was in financial difficulties in 1931, the

Government aided by taking over 100 million marks shares. By allowing reserves to accumulate over the past two years and by selling two coal mines the company was able recently to buy back its shares at a price which realized the Reich a 14 million mark profit. The regained shares will not be placed on the stock exchange, but will be used to reduce the capital to 700 million marks. Payment of a 3½ per cent dividend was made again this year.

Although steel prices throughout almost all Europe have been advanced, an increase in Germany is regarded by the industry as inopportune, and domestic quotations will remain unaltered for 1936.

Protest Emergency Rates on Coal and Ore

Particular protest against emergency railroad rates on iron ore and coal as they apply to Cleveland was made today before the Interstate Commerce Commission by Andrew H. Brown, assistant transportation commissioner and counsel for the Cleveland Chamber of Commerce. The hearings, resumed today, are the final ones to be held on the petition of the carriers to continue present emergency rates. Unless continued the rates will expire June 30.

Mr. Brown told the commission

that while each consuming locality has been called upon to bear the same increase in cents per ton of ore, the percentage of increase is by far the most severe against Cleveland. He pointed out that while the increase on ore amounts to 10c. per ton or 11.2c. per gross ton, no matter where the ore is destined it represents a 12.3 per cent increase to Cleveland, but is only 6.4 per cent on Youngstown ore shipments, 5.4 per cent on Pittsburgh and 5 per cent on Johnstown.

In the case of coal rates, Mr. Brown said, Cleveland has been called upon to bear a greater increase in both cents and percentage than inland points.

Mr. Brown entered a general protest against the permanent continuance of the temporary freight rate increases, contending that they had distorted the rate structure and upset long-established relationships. He pointed out that the surcharge on coal over a period of 16 years would have averaged \$961,260. The surcharge on ore, it was stated, amounted to \$162,000 in 1935.

"It is conservative," he said, "to estimate that on coal and ore alone the emergency charges will cost Cleveland well over \$1,000,000 this year, if they are continued and larger amounts as the volume of our business increases.

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... Rise in steel output is checked at 68 per cent of capacity.

o o o

... Demand is well sustained but ingot supplies have been built up sufficiently to meet mill requirements.

o o o

... First quarter shipments are now largely completed, and new price set-up is being tested.

THE recent sharp rise in steel output, which followed the period of flood curtailment a month ago, has been checked. Production this week is only fractionally higher and the average for the country is unchanged at 68 per cent of capacity. While a few open-hearth furnaces went into production at the beginning of the week, several were scheduled to go off, and the Monday level may scarcely be maintained throughout the six-day period.

Steel production is slightly lower at Chicago, is holding its own at Pittsburgh, Philadelphia, Cleveland, Detroit and Birmingham, and has gained slightly in the Valleys, at Buffalo and in the South Ohio River and Wheeling districts.

FINISHING mill operations continue to rise, but stocks of raw steel have been built up sufficiently since the floods to accommodate current mill schedules. Tin plate production has risen to 90 per cent of capacity, the highest rate of the year, sheet mills are engaged at 75 per cent and rolling of strip is at a 74 per cent rate. Output of heavier products is well sustained, but mills are reluctant to step up operations beyond a rate which they are certain can be maintained over several weeks.

SHIPMENTS against old first quarter contracts will be largely completed this week and some new business is being entered at the new prices and quantity differentials. The set-up on sheets, strip steel and bars has shown no signs of weakness and has been clarified in the case of sheets by the interpretation of the shipment-at-one-time feature. Under this clause mills are now requiring shipment during the calendar week in which

an order is placed, but delivery at one place is still necessary if the quantity deduction is to be allowed.

A HEALTHY feature of the current demand for steel products is the satisfactory balance between users of light and heavy materials. While railroad, construction and ship building steel is moving in increasing volume, automotive consumption does not seem to have reached its peak, and container manufacturers are just getting into their stride.

The schedules of farm implement makers continue at close to capacity, while orders for sheets and strip steel from makers of refrigerators, washing machine tubs, electric signs and household equipment generally are in good volume. Jobbers are again building up their stocks following heavy flood rehabilitation demand, with standard pipe, wire products and galvanized sheets particularly affected.

THE week's structural steel lettings of 20,000 tons are almost twice the 10,575 tons reported in the preceding period, and new projects of 28,045 tons compare with 19,735 tons a week ago. Included in the new work is the Marine Parkway in Brooklyn, which will take 12,000 tons of shapes, 3000 tons of piling and 1000 tons of bars. New bids will soon be asked for on the Outer Drive development at Chicago, requiring 15,000 tons of structural steel.

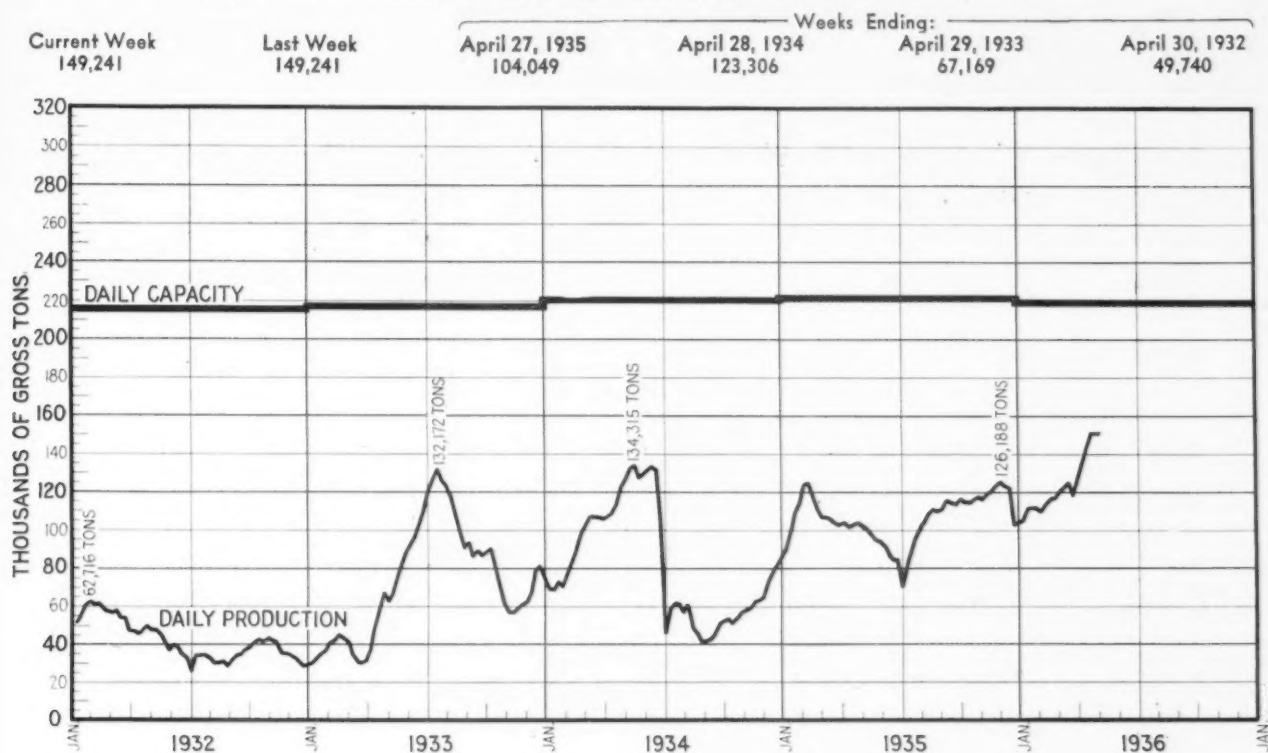
The placing of 2700 freight cars by the Pacific Fruit Express is the feature of the week's railroad buying. The Seaboard Air Line has ordered 100 phosphate cars. Actual and tentative freight car inquiries now before the trade include at least 10,000 units, with orders likely to be placed soon by the Chesapeake & Ohio, the Nickel Plate, the Missouri Pacific and the Northern Pacific.

THE Ford Motor Co. has distributed orders for 490,000 tons of iron ore, and furnace requirements for the shipping season are invariably being estimated above last year's levels.

The raw materials markets are quiet. Scrap prices are generally unchanged, although a large Buffalo consumer bought 35,000 tons of heavy melting steel at an advance over previous quotations. THE IRON AGE composite price of scrap, at \$14.63 a gross ton, is more than \$1 a ton higher than it was in June, 1930, when steel production was last at a comparable level. The pig iron composite is unchanged at \$18.84 a gross ton, while the finished steel index is holding at 2.097c. a lb.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936



STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Same Week Last Month	Weeks Ending:	
				April 27, 1935	April 28, 1934
Pittsburgh	64.0	64.0	42.0	35.0	45.0
Chicago	67.0	68.0	65.0	53.5	59.0
Valleys	73.0	72.0	68.0	56.0	60.0
Philadelphia	45.0	45.0	40.0	32.0	42.0
Cleveland	79.0	79.0	82.0	52.0	69.0
Buffalo	60.0	58.0	43.0	35.0	62.0
Wheeling	82.0	80.0	59.0	77.0	72.0
Southern	67.0	67.0	67.0	55.5	58.0
Ohio River	81.5	78.0	65.0	75.0	65.0
Western	90.0	90.0	70.0	30.0	35.0
St. Louis	80.0	80.0	77.0	37.0	60.0
Detroit	100.0	100.0	100.0	88.0	100.0
Eastern	90.0	90.0	60.0	35.0	55.0
Aggregate	68.0	68.0	58.0	47.0	56.0
Average Year to Date	56.3	55.5	53.2	48.8	43.1

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended				Year to Date	
	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935	1936	1935
Fabricated structural steel awards.....	20,000	10,575	15,150	9,350	332,260	267,500
Fabricated plate awards.....	3,230	600	8,530	3,100	89,475	63,920
Sheet steel piling awards.....	0	200	700	8,050	15,405	13,765
Reinforcing bar awards.....	7,150	3,500	3,000	7,200	133,915	95,990
Total Lettings of Construction Steel..	30,380	14,875	27,380	27,700	571,055	441,175



... Pittsburgh steel output holding with production up two points in the Valleys.

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... Demand for finished steel remains strong, but peak seems to have been reached.

o o o

... Tin plate output higher at 90 per cent of capacity.

PITTSBURGH, April 21.—While the leading producing interest and the large independent have stepped up operations a few points, steel ingot output in the smaller plants has been curtailed. As a result, the Pittsburgh rate continues unchanged at 64 per cent of capacity. In the Wheeling district, output has moved up two points to 82 per cent.

It is apparent that peak production may have been reached in this district. However, there are no signs of any drastic leveling off, as new specifications are coming in at a fairly steady rate. Encouraging features are the continuous appearance of orders for heavy material and the rate of bookings for hot-rolled bars emanating from the automobile industry. Implement makers and miscellaneous sources are also satisfactory outlets.

A fairly heavy tonnage of steel is moving into reinforcing bars with the rapid release of orders for specific jobs due to the appearance of warmer weather. The United States Engineer Office, Kansas City, will receive bids April 30 for approximately 3000 tons of reinforcing bars, to be used for the Fort Peck, Mont., project. Demand for cold-finished material is good, with a wide diversification of orders and satisfactory tonnages.

Over the past month there have been signs of a healthy resumption in building activity due either to new private projects or rehabilitation of buildings and homes. This is reflected in the increased tonnages being booked for standard pipe. Tank car and barge construction are requiring a fair tonnage of plates. An increase in

orders to be used in car-building programs is discernible, with a good possibility of continued improvement.

Tin plate production is at the highest rate this year, with operations at approximately 90 per cent. Requirements from both packers and general line can makers are approaching the best level of the year.

Nothing unusual is occurring in strip production, except that new specifications have gone beyond the expectations of producers, and the latter feel that the recent price set-up has had its initial test. Demand for sheets is still coming in at a good rate from automobile interests, oil concerns and miscellaneous sources.

That part of the quantity differential set-up pertaining to the shipment of large sheet orders at one time has been clarified over the past week. The phrase "at one time" has been more or less vague, in many cases immediate shipment being impossible due to practical difficulties. The industry has defined this part of the selling practice so that all shipments must be made within the calendar week in which instructions for movement of the material are received. This is not considered to be a weakness on the part of producers, but rather a device to allow a normal movement, free from shipping difficulties and yet definite enough so that consumers are in a position to know exactly how and when large tonnages are to be shipped.

In the raw materials markets, coke is moving freely due to increased schedules in blast furnaces and foundries. Refractories are

also in good demand, due to rehabilitation in various steel plants, foundries and blast furnaces.

Pig Iron

Movement of pig iron in the Pittsburgh district continues light, with no outstanding tonnages being placed. The merchant furnace at Sharpsville, Pa., which has been banked for some time, was blown in this week. An additional blast furnace was blown in recently in the Pittsburgh district by a steel-making interest.

Semi-Finished Steel

Demand for semi-finished steel continues good, and movement of tube rounds and sheet bars to non-integrated mills is steady. Fairly large tonnages of skelp are discernible, and shipments of wire rods continue to be satisfactory.

Bolts, Nuts and Rivets

Specifications from jobbers are being fairly well maintained. Heavy requirements from farm implement interests are also in evidence.

Bars

Demand for hot-rolled bars shows improvement over last week, and the origins of specifications are manifold. Automotive interests and implement makers still make up a goodly portion of the total tonnage, and miscellaneous buyers are not only increasing in number, but those in the market are ordering more material. Prices continue to be firm, and seem to have had a fairly good test.

Reinforcing Steel

Releases for material for specific jobs continue heavy due to the appearance of open weather, and the mills are being rushed for this classification of material. However, new orders are coming in, and the price situation in this district has firmed up considerably over the condition prevalent during the first quarter. Since the emphasis is still on shipments, it will probably be a little time yet before recent attempts at price firming are completely tested. Bids will be received for approximately 3000 tons for the Fort Peck, Mont., project, at the United States Engineer Office, Kansas City, on April 30.

Cold-Finished Bars

Demand during the past week has shown improvement, with the classification of buyers varied. Automotive tonnage is being ordered at a good rate, and the recent improvement in farm implement business has not only continued but shows signs of increasing. A fair-sized portion of tonnage received is coming from manufacturers of oil

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.26
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti.....	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†.....	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.2528
Ferromanganese, seab'd carlots.....	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivery quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

Per Lb.:	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary....	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill	2.15	2.15	2.15	2.65
Plain wire, Pittsburgh.....	2.40	2.40	2.30	2.30
Plain wire, Chicago dist. mill	2.45	2.45	2.35	2.35
Barbed wire, galv., P'gh....	2.60	2.60	2.50	3.00
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.55	3.05
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.25

Scrap

Per Gross Ton:	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935
Heavy melting steel, P'gh....	\$15.75	\$15.75	\$15.75	\$11.50
Heavy melting steel, Phila...	13.75	13.75	13.75	9.75
Heavy melting steel, Chicago	14.37 1/2	14.37 1/2	14.75	9.75
Carwheels, Chicago.....	14.00	14.00	14.00	10.50
Carwheels, Philadelphia....	14.75	14.75	14.75	11.25
No. 1 cast, Pittsburgh.....	15.25	15.25	15.25	12.25
No. 1 cast, Philadelphia.....	14.25	14.25	14.25	11.00
No. 1 cast, Ch'go (net ton)...	12.50	12.50	13.00	9.00
No. 1 RR. wrot., Phila.....	13.25	13.25	13.25	10.75
No. 1 RR. wrot., Ch'go (net)	13.00	13.00	13.25	8.00

Rails, Billets, etc.

Per Gross Ton:	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh.	28.00	28.00	28.00	27.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	28.00
Slabs, Pittsburgh.....	28.00	28.00	28.00	27.00
Forging billets, Pittsburgh...	35.00	35.00	35.00	32.00
Wire rods, Nos. 4 and 5, P'gh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Bars, Chicago.....	1.90	1.90	1.90	1.85
Bars, Cleveland.....	1.90	1.90	1.90	1.85
Bars, New York.....	2.20	2.20	2.20	2.15
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80
Plates, Chicago.....	1.85	1.85	1.85	1.85
Plates, New York.....	2.09	2.09	2.09	2.0926
Structural shapes, Pittsburgh.	1.80	1.80	1.80	1.80
Structural shapes, Chicago...	1.85	1.85	1.85	1.85
Structural shapes, New York.	2.06 1/4	2.06 1/4	2.06 1/4	2.063175
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.95
Hot-rolled strips, Pittsburgh.	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

Coke, Connellsville

Per Net Ton at Oven:	Apr. 21, 1936	Apr. 14, 1936	Mar. 24, 1936	Apr. 23, 1935
Furnace coke, prompt.....	\$3.65	\$3.65	\$3.65	\$3.85
Foundry coke, prompt.....	4.25	4.25	4.25	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.50	9.50	9.25	8.75
Lake copper, New York.....	9.62 1/2	9.62 1/2	9.37 1/2	9.12 1/2
Tin (Straits), New York....	46.87 1/2	47.12 1/2	47.75	50.62 1/2
Zinc, East St. Louis.....	4.90	4.90	4.90	4.10
Zinc, New York.....	5.27 1/2	5.27 1/2	5.27 1/2	4.45
Lead, St. Louis.....	4.45	4.45	4.45	3.60
Lead, New York.....	4.60	4.60	4.60	3.75
Antimony (Asiatic), N. Y....	13.50	13.50	13.50	14.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at time a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

April 21, 1936	2.097c. a Lb.
One week ago	2.097c.
One month ago	2.084c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	High	Low
1936.....	2.130c., Jan. 7;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$18.84 a Gross Ton
18.84
18.84
17.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High	Low
\$18.84, Jan. 7;	\$18.84, Jan. 7
18.84, Nov. 5;	17.83, May 14
17.90, May 1;	16.90, Jan. 27
16.90, Dec. 5;	13.56, Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$14.63 a Gross Ton
14.63
14.75
10.33

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

High	Low
\$14.75, Feb. 25;	\$13.33, Jan. 7
13.42, Dec. 10;	10.33, April 23
13.00, Mar. 13;	9.50, Sept. 25
12.25, Aug. 8;	6.75, Jan. 3
8.50, Jan. 12;	6.43, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22

well supplies. Requirements for household utilities, such as washing machines, are still expanding, and bookings from makers of other electrical appliances are very satisfactory.

Tubular Products

Demand for tubular products is showing steady improvement. Orders for oil-country goods are in abundance. There has been a greater volume of business coming from jobbers handling standard pipe used in building construction and repair work. A breakdown of this type of business shows that much of it is going into flood rehabilitation work, both in plants and homes. It is expected that improvement from this source will continue. Orders from the railroads for boiler tubes to be used in repairing locomotives are still in evidence, and there has been a slight increase during the past few weeks in demand for boiler tubes to be used in the manufacturing industry.

Wire Products

With practically all first quarter shipments having been cleared from mills, interest in this market has reverted back to new demand. Satisfactory bookings are being made for manufacturers' wire and spring wire. Signs of seasonal buying by the farming interests have appeared, and within a few weeks movement of products to these interests will be well under way.

Refractories

Demand for refractories materials has been on the increase during the past few months. While some users have been ordering material to replace that damaged during the recent flood, nevertheless the improvement in over-all demand is due to legitimate causes, such as increased operating rates necessitating the putting into operation of equipment long idle. Many plants are also making repairs which they had previously postponed.

Rails and Track Accessories

The local rail mill is engaged on orders from the Baltimore & Ohio which will take approximately three weeks to complete, averaging about 5000 tons a week. Previous to this order work was completed on business from the Erie Railroad. The mill is also engaged in making sheet bars.

Plates and Shapes

Specifications for plates to be used in tank car construction are coming in at a fair rate, and material for barges is showing a satisfactory volume. A fairly good

tonnage of plates has been moving for railroad car building. It is expected that this type of material will be ordered out in much larger volume very soon. Steel plates and structural shapes, amounting to approximately 450 tons, are involved in a contract for coal barges awarded to the Dravo Contracting Co. by The Campbell Transportation Co. Over the past few weeks there has been an optimistic note in the heavy material markets due to an improvement in specifications for construction of private projects.

Tin Plate

Demand for tin plate during the past week has sharply increased, with tin plate production at approximately 90 per cent. Packers' requirements are coming in at a faster rate, and specifications from makers of general line can goods and beer cans have shown a perceptible increase. Producers are extremely optimistic and feel that this high rate of demand will continue for at least another month and a half. Export business is also figuring in the tonnages being ordered.

Strip Steel

Production in this district this week is at approximately 74 per cent. While new specifications so far this month have not been received in the same volume as during the corresponding period in March, nevertheless the amount of bookings being placed has been beyond the expectations of producers. Automobile parts manufacturers and miscellaneous interests, together with implement makers, constitute a large part of the tonnages being received. Second quarter prices are firm, and efforts of some buyers to change the quantity differential set-up have been unsuccessful.

Sheets

Sheet production this week has moved up to 75 per cent. Local interests will have all first quarter business out of the mill by the end of this month. Specifications over the past week, while a little bit lighter than the previous period, have shown a wide diversification. Automobile tonnage was slightly lower. However, this was offset by orders for material to be used for tanks by oil interests. It is the opinion here that enough new bookings have been made to test new prices adequately. That part of the quantity differential set-up pertaining to shipment at one time has been clarified over the past week. Shipment on large tonnages is to be made within the calendar week in which instructions for

shipment have been given. In other words, if a plant instructs a mill to ship material on Monday it must clear the steel works by Saturday, and if, on the other hand, instructions for shipping are given on Wednesday movement must be completed by Saturday of that week.

Coal and Coke

The recent improvement in the movement of blast furnace and foundry coke has continued, with local interests being pushed for shipments. Apparently high operating rates in the steel mills have brought about a temporary shortage in by-product coke, as demand for beehive coke for blast furnace and foundry use has been increasing. Movement of coal to the Lakes is at the stage where most of the boats at the docks have been loaded and are awaiting only more favorable shipping conditions before moving to destination. It is expected that some of the Lakes will be cleared by the first of the month, after which shipments by rail out of this district will be stepped up sharply.

Per Capita Production Well Below 1929

PRODUCTION in manufacturing industry per capita of population in 1935 was 28 per cent below the corresponding figure for 1929, according to an analysis made by the National Industrial Conference Board.

In only two of the 19 industries separately analyzed did the per capita production of 1935 exceed that of 1929. In the plate glass industry, per capita production in 1935 was 113 per cent of that in 1929; in the boot and shoe industry, it was 101 per cent. Production in the locomotive industry, on the other hand, was only 14 per cent of the corresponding figure for 1929.

These comparisons of production on a per capita basis, the board points out, show more accurately than comparisons of total volume, the improvement that must take place before 1929 levels are reached. Population and potential consuming power have increased. For that reason the attainment of 1929 standards, as measured by the per capita share of national income, will require a greater volume of production than in 1929. These comparisons indicate that in nearly all branches of manufacturing industry substantial improvement is needed to produce the equivalent of the 1929 manufacturing output.



... Steel sales and production are checked at recent high levels.

... Ingot output this week is at 67 per cent of capacity.

... Railroad business continues to dominate picture.

CHICAGO, April 21.—A further slight adjustment in ingot output brings the average to 67 per cent of capacity, but specifications for finished steel products remain steady and there is no great significance to the downward change of one point. New sales are moderately lower, but this also can be looked upon as a variation which may readily occur from one week to another and, therefore, does not indicate a definite trend in the market.

Activity in bar mill products is outstanding. Most major consumers are pressing for needs and the miscellaneous demand is again growing. Producers with plants in various districts are matching all bar mill capacities to meet immediate needs regardless of where the consumer may be located.

The tone of the structural market is much improved by State over- and under-pass projects, and the hint that private work may soon increase. On the railroad side of the market are the orders for 2700 cars for the Pacific Fruit Express, 5000 tons of rails for the Pere Marquette and the prospect that two Western lines will buy 10,000 tons of rails. Railroad needs for wire products are considered heavy by most observers, but the carriers continue to buy only in small and scattered lots.

There is a turn toward stronger prices in the scrap market as mills press for deliveries against old commitments and brokers put extra stress upon covering old orders. Foundry grades are moving in far better volume.

Pig Iron

Shipments continue to gain over the March rate and April now seems assured of being the best de-

livery month of the year to date. New buying remains on a spot basis, though numerous foundrymen are beginning to admit that if business holds for much longer at the present rate far heavier commitments will have to be made at an early date.

Rails

The Pere Marquette has divided 5000 tons among three producers and about 10,000 tons may soon be asked for by two Western railroads. Accessory orders total 3000 tons and the need for additional tonnages by most railroads is well established. The light rail market, after showing moderate activity in the early spring months, has now dropped back to extreme dullness.

Plates

The Pacific Fruit Express has ordered 2700 cars of which four lots of 500 each were placed with four private companies, while 700 units will be built in its own shops. The two large equipment inquiries now before car builders are the 2000 cars for the Missouri Pacific and 750 cars for the Northern Pacific. There is moderate activity in plate work for oil producing areas but the bulk of the tonnage has been going to Eastern fabricators. Chicago plate shops report only small and miscellaneous orders and mills are in large measure dependent upon car shops and the general run of plates used in structural shops.

Bars

Mills in this area are enjoying their most prosperous period since the great stock market crash. Many shapes and grades cannot be had in better than three to four

weeks and producers with mills at other centers are matching all available facilities in efforts to meet consumers immediate needs. Miscellaneous demand is climbing and needs for automobiles are heavy. There are no unsteady influences in the farm implement picture and road machinery builders are well engaged.

Structural Material

The Outer Drive Bridge, Chicago, requiring 15,000 tons is soon to be readvertised and bids will be taken on the project which, in accordance with orders from Washington, has been divided into five sections. In the meantime, tenders will be received on 3000 tons for the Randolph Street Viaduct which is a part of the general Outer Drive plan. Fabricators are much encouraged by gains in both new orders and inquiries, the former standing at 4000 tons and the latter at 9000 tons, both including miscellaneous small jobs. The prospects for State work are excellent and the chances for private lettings appear to be improving.

Wire Products

April bookings are falling short of the boom month of March but shipments this month are averaging by far the best of the year to date. Demand from manufacturers is excellent and jobbers are distributing wire products at a rapid rate. The railroads are comparatively quiet but highway departments are using and plan to use exceptionally large quantities of highway guard material. Mill stocks are low and continue to drop despite operations that range from 70 to 75 per cent of capacity. Prices are reasonably stable but they have not as yet undergone real tests.

Sheets

New business is coming in faster and there is now less discrepancy between orders booked and shipments, thereby giving a materially better outlook to the market as a whole. There is no improvement in deliveries which still average about 30 days. Jobber distribution continues to improve and miscellaneous manufacturers are showing active interest in the market.

Cast Iron Pipe

Shipments are exceptionally good and the average to date in 1936 is fully 30 per cent heavier than in the first part of last year. There is a fairly steady stream of small orders but buying for long runs of pipe is absent and there is little prospect of revival of that type of business. A few new orders are for as much as five cars each but

the general run of new business averages a carload or less. Prices remain firmly established.

Reinforcing Bars

Contractors are pressing hard for deliveries of bars that were not taken earlier in the year when extreme cold weather put an effective stop to out-of-doors construction. Faced with this situation, several shops have put on night forces. New business is coming in slowly and order books are shrinking. However, this condition may soon be bettered by State work which has been held in check in order to favor political speeches, and by some private work which is beginning to take shape. Prices are on a substantial footing.



...Pig iron demand increasing slowly.

...Early upturn in steel bookings is looked for.

CINCINNATI, April 21.—Demand for pig iron is expanding slowly as melters exhaust inventories built up during the closing weeks of the first quarter. For-

ward commitments are lacking, but current ordering for needs is averaging about 1200 tons a week. Of course, the bulk of material is from Northern furnaces, but Southern iron continues to hold a share of melters' interest. Prices are adhering stubbornly to published schedules, no concessions being reported. The Hamilton Coke & Iron Co. will take its furnace out of production about June 1, for rebuilding and enlargement.

Pig iron melt is hovering around 65 per cent of capacity output with automobile and stove foundries most active. Machine tool melters, however, are pressing forward at an optimistic pace.

While sheet steel is in steady demand at less than capacity rate, inquiries of automobile makers as to mill capacity and future delivery possibilities have stimulated forecasts of an early spurt to full capacity bookings. Motor car manufacturers are currently in the market for close to their normal proportion of business and other sheet consuming industries are steadily active. Barrel manufacturers are reducing specifications, but this is being offset by expansion in other fields. Current bookings are at about 80 per cent of mill capacity and production is on a parity with demand to satisfy shipping urgencies.

Steel ingot production has advanced five points to about 82 per cent. One interest is contemplating the lighting of another open-hearth this week.



...Pacific Fruit Express places 2000 cars and will build 700 in its own shops.

...Much private construction on Coast.

SAN FRANCISCO, April 21.—Awards for 2000 refrigerator cars have just been made at San Francisco by Pacific Fruit Express Co., controlled jointly by Southern Pacific and the Union Pacific. Pullman-Standard Car Mfg. Co., American Car & Foundry Co., Pacific Car & Foundry Co. and General American Transportation Co. were each allocated 500 cars. It is reported that Pacific Fruit Express Co. will itself build 700 cars. From the original requirement of 3000 cars a reduction of 300 cars was made. Steel involved in the lettings will aggregate 24,760 tons of structural steel and plates, 3850 tons of sheets, 7650 tons of steel castings, 21,600 wheels and 10,800 axles.

Private construction on the Coast is receiving headlines. At Los Angeles the Twentieth Century-Fox Film Corp. has just placed 410 tons of bars with Truscon Steel Co. for property storage building and the same company is completing plans for two sound stages which will involve 1000 tons of bars, 600 tons of shapes, 200 tons of steel pipe and 200 tons of cast iron. Spreckles Sugar Co. is completing plans for refinery extensions near Woodland, Cal., estimated to cost \$2,000,000. Excavation work is under way at Oakland, Cal., for the new Illinois-Pacific Glass Co. plant.

Lettings during the past week were limited in number and, with the exception of the Pacific Fruit Express Co. awards, for lighter tonnages. School construction in the Los Angeles area featured the new inquiries. Although Salem, Ore., is taking bids May 1 on water system improvements, including 250 tons of bars for a reservoir, it is not believed that the call for bids includes the pipe line in which 5000 tons of plates are involved.

Mill operations continue at a favorable rate and warehouse business is reflecting the more active industrial demand.

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Republic Names New Philadelphia Manager

L. CASKEY has been appointed Philadelphia district sales manager of Republic Steel Corp., succeeding J. B. DeWOLF, who has been transferred to Cleveland as assistant to the manager of the tin plate division. Mr. Caskey joined the Republic organization in January, 1929, and previous to that time was Cincinnati district manager of the Erie Malleable Iron Co. Mr. DeWolf has been Philadelphia district manager since October, 1930, and was previously located at Youngstown as assistant manager of the tin plate division of the old Republic Iron & Steel Co.

Trade with Italy Improving

THE first official figures showing the effect of sanctions on Italian trade in the first three months following their application were issued April 15 by the League of Nations. According to the report, the United States appears as one of the leading countries in helping Italy to finance her Ethiopian campaign by buying more Italian goods. At the same time, this country seems to be profiting from increased exports to Italy. The following table gives imports and exports as compared with the three-month period a year earlier:

IMPORTS FROM ITALY

November, 1934	\$2,487,000
December, 1934	1,927,000
January, 1935	1,651,000
November, 1935	3,649,000
December, 1935	2,820,000
January, 1936	1,876,000

EXPORTS TO ITALY

November, 1934	\$5,033,000
December, 1934	2,866,000
January, 1935	3,695,000
November, 1935	5,779,000
December, 1935	4,039,000
January, 1936	3,223,000

Bethlehem to Exhibit At Mining Congress

AN outstanding feature of the Bethlehem Steel Co. exhibit at the forthcoming American Mining Congress Exposition in Cincinnati will be an all-welded, lightweight mine car of the latest type.

This car is made of Molybdenum and Mayari R Steel, and weighs

about 3000 lb. Its design embodies the drop-axle feature which permits the lowering of the body to provide adequate clearance even with the lowest rail.

The drop-axes provide a means for holding the wheels true to gage and in perpendicular alignment to the track. The wheels can drop as much as an inch in compensating for irregularities in track levels.

Another interesting display will show the trend in mine-tie development from a standpoint of weight, sizes, and shapes, with small sections of mine ties used in various periods. Representative examples of the different types of Bethlehem steel mine ties will be available for examination, in addition to two types of steel switch ties.

A section of the exhibit will be devoted to forged steel mine car wheels and other supplementary equipment common to the mining industry.

Fabricated Steel

(CONCLUDED FROM PAGE 72)

State of Missouri, 155 tons, highway bridge; Kelly & Underwood, Granby, Mo., low bidder on general contract.

WESTERN STATES

Woodland, Cal., 500 tons, plant for Spreckles Sugar Co.; bids in about 90 days.

Los Angeles, 127 tons, tunnel ribs for Metropolitan Water District; bids opened.

West Los Angeles, Cal., unstated tonnage, two sound stages for Twentieth Century-Fox Film Corp.; plans being completed.

Fort Peck, Mont., 324 tons, emergency gate shafts in tunnels; bids May 21.

FABRICATED PLATES

AWARDS

Brooklyn, 230 tons, Allied Independent Alcohol Corp., 13 tanks, to Chicago Bridge & Iron Works.

Marcus Hook, Pa., 1700 tons, tanks for United States Treasury Department, to James Russell Boiler Co.

Cincinnati, 450 tons, coal barges for Campbell Transportation Co., to Dravo Contracting Co.

Manitowoc, Wis., 750 tons, marine work for Great Lakes Dredge & Dock Co., to Manitowoc Shipbuilding Corp.

Portland, Ore., 100 tons, tanks for Shaver Transportation Co., to King Brothers.

NEW PROJECTS

St. Paul, Minn., 500 tons, dredge for United States Engineer.

Denver, 124 tons, Ralston Creek dam, outlet works and spillway for city; bids May 12.

Fort Peck, Mont., 180 tons, emergency gate shafts in tunnels; bids May 21.

Grand Coulee Dam, Wash., 100 tons, hulls for pump barges at Grand Coulee dam; bids opened.

West Los Angeles, 200 tons, two sound stages for Twentieth Century-Fox Film Corp.; plans being completed.

SHEET PILING

NEW PROJECTS

Brooklyn, 3000 tons, Marine Parkway Authority; bids to be taken in May.

NOPAK VALVES

An air leak equal to $\frac{1}{16}$ " diameter hole costs \$28.00 per month. Air is expensive, control it efficiently and accurately with a NOPAK valve—a patented leak-proof valve guaranteed to stay tight without maintenance. Its flat, patented disc together with a packless spindle prevents sticking and assures you of many years of leak-proof operation. Permits throttling or quick opening. Easy to operate. Seat protected at all times and cannot wear out. NOPAK valves are suitable for air, gas, water, or oil. Write for Bulletins.



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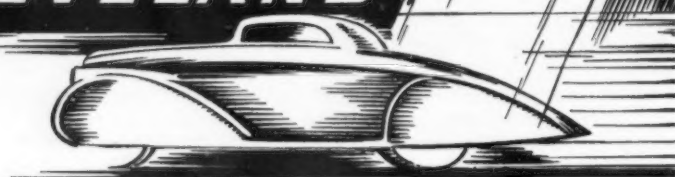
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CLEVELAND



... Mills pressed by demands of automobile industry for May delivery.

o o o

... Steel production is holding at 79 per cent of capacity.

o o o

... Sheet and strip orders are being placed at full quoted prices and quantity differentials.

CLEVELAND, April 21.—Demand for finished steel is being maintained at the recent good volume. With increased production schedules, automobile manufacturers have come into the market with new specifications for sheets and strip steel covering their May requirements and are crowding the mills for shipments of outstanding orders. Some, in urgent need of sheets, have been shopping around for additional steel for delivery during the first week in May. Some sheet mills have not yet shipped all the steel covered by first quarter contracts, not being able to complete deliveries by April 15, as they expected. With the new tonnage that has come in this month, they are taxed to capacity.

Ingot output in the Cleveland-Lorain district is unchanged at 79 per cent of capacity. Miscellaneous business in finished steel continues fairly heavy. There is no sign of a falling off in orders this month that some had expected following the heavy specifications in March, against first quarter contracts.

Demand for sheets from manufacturers of refrigerators who are now in full swing on new models has increased and a good volume of business is now coming from makers of washing machine tubs, stoves and other household equipment. Manufacturing has been stepped up by makers of electric signs, table tops and other consumers of enameling sheets.

In the construction field there is an increase in the demand for structural shapes for private work and more public work is coming out. Efforts of consumers to secure modification of the new quantity differentials on finished steel, appear to have subsided. Some of the larger consumers, particularly in

the automotive field, have placed orders for lots not entitled to the maximum deduction without questioning the price.

The Ford Motor Co., the largest open market buyer of Lake Superior ore, closed this week for its ore requirements for the present season, dividing the business between several producers. The Ford inquiry was for 490,000 tons and the aggregate purchases are understood to have totalled that amount.

Pig Iron

Furnaces are getting a good volume of orders, but they are almost entirely for small lots. Foundries see no advantage in making extended commitments and some are buying only for a few weeks' requirements and others have resumed their former practice of purchasing car lots as needed. New demand is restricted to some extent by the stocks that some foundries took in at the end of the first quarter and many of these will have enough iron to last them through the current quarter. The aggregate volume of sales is running somewhat behind March.

Iron Ore

Most consumers having long-term contracts have made up schedules for ore shipments for this season and in nearly all cases the furnaces will take more ore than last year. The inquiry of the Ford Motor Co. for 490,000 tons has been acted upon.

Consumption of Lake Superior ore in March was 2,897,867 tons, an increase of 265,561 tons over February. This compared with 2,582,986 tons consumed in March last year. Furnace stocks April 1 were 18,199,287 tons. Stocks of ore at furnaces and Lake Erie docks

April 1 were reduced 4,000,000 tons as compared with the same date a year ago, furnace and dock stocks being 22,933,433 tons, as against 26,931,629 tons on that date a year ago. Central district furnaces in March consumed 1,360,386 tons, an increase of 56,172 tons. Lake front furnaces used 1,515,136 tons, a gain of 207,733 tons, and all rail furnaces melted 22,331 tons, an increase of 2279 tons. Eastern furnaces used only 14 tons, a loss of 623 tons. There were 104 furnaces using lake ore in blast March 31, an increase of 3 for the month.

Bars, Plates and Shapes

The volume of business in steel bars from forge shops and other makers of automobile parts is heavy and specifications continue to come in good volume from makers of agricultural implements and road machinery. Demand for alloy steel bars is fair. Good specifications are being placed for structural shapes. Inquiry for steel for private building work is better than for many months. Awards include 1200 tons for a Lorain County bridge and 300 tons for buildings for the National Carbon Co. A Cleveland contractor has taken 1275 tons for construction work outside of this territory including 1250 tons for a wire mill building for the Republic Steel Corp. in South Chicago. Demand for reinforcing bars while showing some gain, is still only moderate. Business in plates for miscellaneous consumers shows quite an improvement.

Bolts and Nuts

With sales somewhat heavier than in March, the volume of business is quite satisfactory. The demand is much better for small than for large bolts, as the former are used by the automobile and agricultural implement and many miscellaneous consumers. The industry is operating at about 50 per cent of capacity, or better than in a long time. Prices to consumers appear firm, but the extra 10 per cent discount that had been allowed jobbers but which was to be withdrawn at the start of the current quarter has not been entirely eliminated.

Sheets

Demand from the motor car industry has taken a spurt. Mills have booked a large tonnage from that source for May delivery and the automobile manufacturers are crowding for deliveries and have been scouring the market to find producers who could take on additional tonnage for the week of May 4. Some producers have not completed rolling sheets covered by

first quarter contracts, which helps to account for the present tight situation. Most mills have full rolling schedules on all sheet products for the next two weeks with the exception of plain hot-rolled sheets. Refrigerator manufacturers have placed some new orders, and these, with makers of washing machine tubs, are very busy. Demand for sheets for the fabrication of building material is very good and there is a heavy demand from makers of culverts.

Strip Steel

Considerable new business has come from automobile manufacturers, and deliveries have been extended by some of the mills. Orders for filling in stocks have been placed by leading automobile parts makers, who are stepping up production schedules.



... **Southern plant books 100 freight cars.**

... **Pig iron and steel production unchanged.**

BIRMINGHAM, April 21.—The Bessemer, Ala., plant of the Pullman-Standard Car & Mfg. Co. has booked 100 phosphate cars from the Seaboard Air Line. This is the second order placed in the Birmingham district within the past two weeks by the Seaboard. The other was for 5,000 tons of rail. Production of the cars will not start until early June. Plans are now being made to reopen the Pullman plant, which has been idle since October.

Dispatches from Washington state that the low bid of the Ingalls Iron Works and Chicago Bridge & Iron Co., for the steel pipe for Birmingham's industrial water system, has been approved. These two companies submitted a joint bid of \$1,236,843 on April 10, as previously reported.

T.V.A. has awarded the American Bridge Co. the contract for steel towers for transmission between Wheeler Dam and the new one at Guntersville, Ala., which is just getting under way.

Steel buying is continuing at a fair rate. Demand for sheets and wire products from dealers and jobbers has fallen off a little on account of heavy buying in March. Bar, plate and structural tonnage is gradually increasing, as construction work gains momentum.



... **Much plant and mill expansion going on.**

o o

... **Pig iron business quiet.**

TORONTO, April 21.—With new business flowing in at a steady rate in the Canadian iron and steel markets, many companies are adding to plant equipment, building additions and making general improvements, while others are arranging to start work of this nature.

Demand for machine tools and general equipment has increased considerably since the beginning of the year and many branches of industry are playing an important part in stimulating machinery sales. Dominion Foundries & Steel Ltd. Hamilton, Ont., is enlarging its cold rolling and tin plate departments to bring capacity up to 30,000 or 40,000 tons per year. Shenango Gold Mines, Ltd., L. A. Normandin, president, 307 Bank of Hamilton Building, Toronto, is in the market for 250 hp. Diesel engine or steam engine as well as milling equipment for 50-ton mill

addition at its property in Obo.

Dominion Steel & Coal Corp., Sydney, N. S., has completed rebuilding No. 1 blast furnace at a cost of \$400,000 and blew in April 15. At present five blast furnaces are blowing in Canada, three at Sydney, although it is stated that one stack here will be blown out or banked. Canadian steel mills are maintaining operating schedules of approximately 75 per cent of capacity, the highest rate for several years, while foundries and other producing companies are running around 60 to 70 per cent capacity.

While merchant pig iron sales slowed down for a few days owing to the Easter holiday season, business again is back to normal and shipments are going ahead on schedule and demand is improving. Iron sales, all grades, for the past week are reported at approximately 1300 tons, made up of lots ranging from a car to 300 tons, with average awards running from 100 to 200 tons. Demand centers largely on foundry iron, but sales for malleable are extending and odd lot awards of basic are reported from melters in Ontario and around Montreal. Inquiries for pig iron are appearing and local blast furnace representatives look for increased deliveries with the opening of Great Lakes navigation. A few melters have booked for second quarter delivery but the majority continue to buy for spot delivery only although sales on the latter account are increasing both in number and tonnage.



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PHILADELPHIA



... District rate unchanged at 45 per cent.

o o o

... Mill operations may ease off during next fortnight.

o o o

... Finished steel and scrap prices due for tests soon.

PHILADELPHIA, April 21.—Among district producers, there is an undercurrent of feeling to the effect that current operations represent peak activity for the time being. Although all mills are actively engaged in filling orders, these orders in many instances were taken at low prices and supposedly must be shipped out before the end of the month. Practically all of this first quarter business will be off the books in the next two weeks, according to leading sales offices, although the trade would not be particularly surprised if certain tonnages hold over into May.

Some district melters are showing indications of easing opera-

tions. Although no ingots are being stocked, present open-hearth output is well able to take care of rolling mill demands, and, in some instances, plans are afoot for reducing operations. Currently there are no indications that these reductions will be cancelled by rises in other plants.

Pencoyd has added a fourth furnace, but one unit has about completed a campaign and the plant expects to be down to three again by next week. Similarly, Phoenix has added a third furnace but plans to take off one by the end of the week. Alan Wood has taken one unit off and now has three making steel, Central continues to operate practically at capacity, and

Bethlehem production is unchanged. The average district rate is unchanged at approximately 45 per cent of capacity.

Very little new second quarter business has been booked. Many finished steel prices are untested, therefore the market status is slightly uncertain despite sellers' insistence that published quotations will be rigidly upheld. Some alloy billet tonnages were placed during the week.

Pig Iron

Several fair-sized orders were placed during the past seven-day period for second quarter delivery at published price levels. Furnace representatives look forward to additional business, although they admit that aggregate purchases continue to run far behind actual consumption. Even though foundry activity is better than it has been for several years, this is not reflected in iron sales. Jobbing plants still have yard stocks to dispose of and the use of purchased scrap has become so general that nothing short of a \$4 rise in cast scrap prices would alter the practice. This latter happening is very unlikely.

Sheets and Strip

Large Mid-Western mills are having difficulty in delivering first quarter orders on schedule, but district producers are easily able to ship out hot-rolled and blue annealed grades on short notice. Little new business has been placed. Already several sellers have been approached with requests for preferential price treatment, which has been refused. The tonnages involved were small and buyers were not very insistent, therefore the market still can be considered untested to a degree although all indications point toward firm maintenance of published price levels. Automobile stamping plants are ordering moderate tonnages steadily as old orders are liquidated. Budd still has about 500 tons of stainless strip to purchase, and it is probable that this same company will receive a new Chevrolet frame order and come into the market for steel to fill this order.

Bars, Plates and Shapes

The Pennsylvania Railroad last week issued very heavy releases for its car building program to a number of mills. These latest releases complete contracts for several producers, although full deliveries will not be effected for several months. Shipyards, likewise, are taking deliveries regularly, although little new business has been placed recently. Considerable steel is yet to be purchased, and all sellers are

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petitioning for their share of tonnages. Small orders for reinforcing steel are more frequent, and distributors are fairly active even though the total tonnage involved is far from impressive. The structural steel market, although not lifeless, is nevertheless much less active than is normally expected for this time of the year. About 900 tons of new business, consisting of two bridges, is up for bidding, and awards during the week totaled only 570 tons.

Imports

The following iron and steel imports were received here last week: 1948 tons of pig iron from British India; 193 tons of structural shapes, 130 tons of steel bands, 104 tons of steel bars and 18 tons of diamond plates from Belgium; 35 tons of steel bars, 5 tons of steel hoops and 8 tons of steel bands from Germany; 9 tons of steel bars, 4 tons of steel bands and 19 tons of structural shapes from France, and 5 tons of C D S wire from Sweden.



... Steel ingot output higher.

... Structural and reinforcing bar interests busy.

BUFFALO, April 21.—The Lackawanna plant of the Bethlehem Steel Corp. is operating 19 of its 24 open-hearth furnaces this week, with the possibility that during the week, another unit will be added. Seneca sheet division of Bethlehem is at 80 per cent of capacity. Republic Steel Corp. has added a furnace and now has five active while Wickwire-Spencer is running one.

Fabricating shops and reinforcing bar distributors are busy with a heavy volume of small-sized lots. There are any number of 40, 50 and 80-ton jobs coming out, and a few larger ones. Bids will be taken May 4 on a Binghamton, N. Y., school to require 1000 tons of structural steel. Other structural jobs looming include, a medical college for Syracuse University, 600 tons, with bids closing April 29; and a State bridge job of 400 tons in Broome County, on which bids close April 21.

New construction for the Eastman Kodak Co., Rochester, involving 1600 tons of reinforcing bars, has been awarded a Rochester concern.



Wheeling & Lake Erie is building 50 automobile cars and rehabilitating disabled cars in its Toledo shops.

Pacific Fruit Express has ordered 500 refrigerator cars each from General American Car Co., American Car & Foundry Co., Pacific Car & Foundry Co., and Pullman Standard Car Mfg. Co., and is building 700 additional refrigerator cars in its own shops.

Norfolk Southern is inquiring for three light-weight passenger coaches, three light-weight passenger and baggage cars, and three light-weight baggage and mail cars.

Seaboard Air Line ordered 100 70-ton phosphate cars from Pullman-Standard Car Mfg. Co.

Missouri Pacific has recalled an invitation for bids on equipment trust certificates to finance purchase of 1500 box cars and 500 coal cars at a cost of about \$4,750,000. Offer probably will be renewed early in July.

New York, Chicago & St. Louis is expected to buy or build 500 box, 225 gondola and 50 flat cars.

Timken bearings and boxes will be used on all driving axles of eight of new class 4-6-6-4 locomotives, and Timken bearings and boxes will be used on all engine, trailer and tender trucks of 12 class 4-6-6-4 locomotives to be built for Northern Pacific by American Locomotive Co.

RAILS AND TRACK SUPPLIES

Seaboard Air Line has ordered 3500 tons of rails from Bethlehem Steel Co.

Pere Marquette has distributed 5000 tons of rails among three producers.



... Agricultural implement foundry melt remains at capacity.

... Structural shape demand better.

ST. LOUIS, April 21.—The agricultural implement industry continues to be outstanding in the melt of pig iron in this territory. The plants in the Tri-cities are going at full rate of production and order files are said to be the heaviest known, one large concern reporting that it is behind 150 working hours in production. Operators are reported as saying that they can see no indication of let up.

An increase in operations of the stove plants in the Belleville district is reported. Shipments so far

this month are ahead of the same period a year ago, but less than in March.

Specifications for structural shapes showed a marked improvement during the week as a result of an increase in highway bridge awards. The movement of roofing to warehouses is heavier than it has been for some time as a result of farm activities. Laclede Steel Co. has been awarded 200 tons of reinforcing bars for a building for the St. Louis Dairy Co. The State of Illinois will open bids Friday for highway projects requiring 1700 tons of structural steel.



Peoples Natural Gas Co., 545 William Penn Way, Pittsburgh, plans new 8-in. welded steel pipe line across Conemaugh River, Black Lick Township, for natural gas transmission.

Detroit Edison Co., Detroit, plans 36-in. welded steel pipe line from steel works near its Delray electric generating plant to boiler station of such plant, about 2700 ft., for transmission of blast furnace gas for fuel supply.

Virginia, Minn., plans about 17,000 ft. of 2-in. steel pipe for gas distribution in South side district, replacing present mains. M. C. Bright is superintendent of water and light department.

Union Sulphur Co., Sulphur, La., plans new 6-in. welded steel pipe line from Old Town Bay oil field district, La., to terminal properties at Ross Bluff on Calcasieu River, near Lake Charles, La., about 14½ miles, for oil transmission. Cost over \$100,000. Executive offices are at 33 Rector Street, New York.

Bureau of Reclamation, Denver, closes bids May 1 for two 72-in. and one 52-in. welded steel pipe lines for diversion system in outlet works of Arrowhead Dam, Boise Project, Idaho (Specifications 787-D).

Continental Oil Co., Ponca City, Okla., plans new 8-in. welded steel pipe line from oil field near Ada, Okla., to Oklahoma City, about 110 miles, for crude oil transmission. Cost close to \$1,000,000. Pumping stations will be built at points along line for booster service. Executive offices are at 60 East Forty-second Street, New York.

Stanolind Pipe Line Co., Philcade Building, Tulsa, Okla., plans reconditioning, replacements and improvements in crude oil welded steel pipe line from Teapot Dome district, Wyo., to Freeman, Mo.

Phillips Petroleum Co., Bartlesville, Okla., plans about 7500 ft. of 24-in. welded steel pipe in Everest Avenue, Oklahoma City, for natural gas transmission. Cost close to \$45,000. A. H. Riney, Bartlesville, is company engineer.

San Diego Consolidated Gas & Electric Co., San Diego, Cal., will start work May 15 on new 2½ and 3-in. 15-mile trunk line, completely Lindewelded, for natural gas transmission from Carlsbad to Escondido, Cal.

Camas, Wash., closes bids April 28 for 2722 ft. of 7-gage, 14-in. steel pipe, plain ends, hot-asphalt dipped, for main water line; also for welded tees, welded crosses and other fittings. Hugh MacMaster is city clerk.



... Large structural projects in prospect, with Marine Parkway in Brooklyn outstanding.

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... Eastern freight car builders releasing tonnages.

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... Lighter steel products continue rather quiet.

NEW YORK, April 21.—The heavy steel products continue to dominate the metropolitan market. While orders for sheets, strip steel and wire goods have shown some improvement since the beginning of the quarter, demand is still confined largely to small lots for immediate delivery. Shipments against first quarter contracts have now been largely completed and some new business is being taken on the new price basis.

While structural steel awards are not outstandingly heavy, new inquiry is improving. The proposed Marine Parkway in Brooklyn, on which bids will be taken by the Marine Parkway Authority

next month, will take 17,000 tons of steel, including 12,000 tons of structural shapes, 3000 tons of piling, 1000 tons of reinforcing bars and 1000 tons of miscellaneous rolled steel and castings.

Post & McCord, Inc., will erect, and American Bridge Co. will fabricate 1200 tons of structural steel for an addition to the American Radiator Building in West Fortieth Street, Manhattan. New structural inquiries include 1500 tons for an addition to St. Luke's Hospital and six bridges for the New York Board of Transportation in Queens, calling for a similar tonnage.

With 800 freight cars for the Erie already placed, interest is cen-

tered on the plans of the Nickel Plate and the Chesapeake & Ohio. The former is expected to buy or build 500 box, 225 gondola and 50 flat cars, while the Chesapeake & Ohio will inquire soon for 6000 new freight cars and repair parts for 1700 hoppers. Eastern builders benefited from the orders placed at San Francisco by the Pacific Fruit Express. The Seaboard Air Line awarded 100 phosphate cars to the Birmingham plant.

Demand for tin plate is temporarily slack, but the can companies are expected to release increasingly large tonnages during May. Their stocks are now relatively low, but tin plate makers are still carrying rather large inventories in order to meet the demands of consumers for rush shipments. Makers of oil and beer cans continue very busy.

The wire market has been quiet since the first of the month, but jobber stocks are being rapidly depleted because of increased small building activity. The pipe market has been similarly affected and mill shipments of standard pipe to distributors are improving.

Announcement by the Bethlehem Steel Co. of slow cooling process for the manufacture of rails has created wide interest. The process will be used this year on the company's entire product. Progress is also reported in the development of end-hardened rails which might be expected to add greatly to the life of the product.

Pig Iron

New business secured by producers and distributors in this district last week averaged better than in the preceding period, but volume of sales was not impressive. Jobbing foundries are said to be the trade's best class of customers at present, with individual purchases restricted to carlot quantities and prompt shipment a feature of most transactions. Sections of the State Barge Canal on the main route to Buffalo will be officially opened today, and the opening of the Champlain Canal is reported scheduled for April 27. The Troy, N. Y., furnace is expected to go into blast on or about May 1. The Mystic stack at Everett, Mass., was originally scheduled to be blown in on this date also, but delays in shipment of relining material may effect a postponement.

Reinforcing Steel

A slight increase in buying is reported by reinforcing bar sellers. Orders are still small and consist mostly of three to 50 ton lots. W. S. Ames & Co., Jersey City, report several small orders totaling about



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100 tons from the procurement division of the Treasury Department. Bids will be taken in May on 1000 tons of reinforcing bars by the Marine Parkway Authority in Brooklyn.



... Flood effects no longer felt in New England.

o o

... Textile machinery makers continue relatively inactive.

BOSTON, April 21.—Industrially, New England continues to gain, although slowly. Effects of the recent floods have been practically eliminated. Demand for skilled labor is increasing, averaging about 30 per cent above January. The woolen mills are busy on old orders, while the cotton weavers are doing comparatively little. The cotton mill situation, not only in New England but elsewhere, is reflected in the machinery field.

The Draper Corp., Hopedale, Mass., is melting only three or four days a week, and other textile machinery makers on about the same basis. The Whiting Machine Co. is booking good rayon machinery business, having equipped itself for such work three or four years ago. The Saco-Lowell Shops, Biddeford, Me., following a shutdown for two weeks because of flood, has resumed melting.

Pig iron buying has picked up, but is by no means active. Approximately 1500 tons sold the past week for second quarter delivery, and a few hundred tons additional for prompt shipment. However, foundries in general apparently are in no hurry to cover future requirements, despite the fact many expect higher prices for third quarter iron. Aggregate New England melt increased about 2 per cent in the past week.

The structural steel and cast iron pipe markets continue moderately active. Harwich, Mass., this week will open bids on 1600 tons, mostly 10 in. pipe, the largest individual tonnage bid in some time. Reinforcing steel bar firms are getting some business, but mostly in small tonnages.

CAST IRON PIPE

Providence, R. I., has awarded 800 tons of 6, 8 and 12-in. to United States Pipe & Foundry Co.

Procurement Office of Treasury Department has awarded 100 tons for Auburn, N. H., to Warren Foundry & Pipe Corp.

Mansfield, Mass., has awarded 54,100 ft. of 6, 8 and 12-in. to Warren Foundry & Pipe Corp.

Salisbury, Mass., has awarded 13,000 ft. of 6 and 8-in. to Warren Foundry & Pipe Corp.

Milton, Mass., has awarded its 1936 contract, involving approximately 200 tons, to Warren Foundry & Pipe Corp.

Oswego, N. Y., plans pipe lines for water system in Fruit Valley district. Cost close to \$45,000. C. H. Snyder is city engineer.

Lewiston, N. Y., will ask bids early in summer for pipe for water system; also other waterworks installation. Cost about \$60,000. John H. Keller, 693 Orchard Parkway, Niagara Falls, N. Y., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until May 1 for 800 ft. of 12-in. bell and spigot water pipe; also for 30 cubic inches water pipe bends (Schedule 3140).

Gate City, Va., will ask bids soon on pipe for water system. Cost about \$15,000.

Oostburg, Wis., has approved bonds for \$54,600 at special election for pipe lines for water system and other waterworks installation. Jerry Donohue Engineering Co., 608 North Eighth Street, Sheboygan, Wis., is consulting engineer.

Park Falls, Wis., has placed 8550 ft. of 8-in. with Crane Co.

Oconto, Wis., will vote April 28 on purchase of private water plant at \$140,000 and improvements costing \$35,000, including elevated tank, electric pumps, etc.

Kenosha, Wis., has placed 2400 ft. of 6-in. class B with American Cast Iron Pipe Co.

Rewey, Wis., has placed 6600 ft. of 6-in. with James B. Clow & Sons.

Valparaiso, Ind., plans pipe lines for water supply and other waterworks installation for improvements in system. Charles Brossman, Chamber of Commerce Building, Indianapolis, is consulting engineer.

West Lincoln, Neb., plans pipe line for main water supply from Lincoln. Cost about \$38,000. Bond issue has been approved, including financing through Federal aid. Scott & Scott, Bankers' Life Building, Lincoln, are consulting engineers.

Enid, Okla., plans new 16-in. for main water line from new wells in northwestern district. Special election will be called at once to approve bonds for \$140,000 for project.

Doniphan, Mo., will soon take bids for pipe lines for water supply; also for elevated steel tank and tower and other waterworks installation. Cost about \$50,000. William A. Fuller & Co., 2916 Shenandoah Avenue, St. Louis, are consulting engineers.

Endora, Kan., plans pipe lines for water supply; also other waterworks installation. Cost about \$54,000. Special election has been called on May 4 to approve bonds for \$31,000, remainder of fund to be secured through Federal aid. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

Gunnison, Utah, has called special election to vote bonds for pipe lines for water system. Bids will be asked soon.

Twentieth Century-Fox Film Corp., West Los Angeles, will take bids soon on 200 tons for studio extensions.

Salem, Ore., closes bids May 1 for pipe for connecting new 10,000,000-gal. reservoir with present water system. Stevens & Koon, Spalding Building, Portland, are consulting engineers.

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... Composite unchanged at \$14.63, as compared with \$13.42 on June 10, 1930, the previous high record for steel mill operations.

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... Bethlehem's purchase of 35,000 tons at Buffalo is week's outstanding event.

o o o

... Market structure uncertain but not weak.

APRIL 21.—Scrap prices reflect mill activity to a considerable extent, and it is therefore significant that the current composite of \$14.63, with mill operations of 68 per cent, is over \$1 higher than the \$13.42 composite on June 10, 1930, the last time operations were at a comparable level. This difference is explained by the absence of scrap supplies due to severe winter weather and the constant withdrawals for foreign shipment.

Bethlehem's entrance into the Buffalo market for about 35,000 tons of steel at prices 50c. to \$1 above the quoted market did much to bolster up lagging sentiment in the East. Also the undertone at Chicago is improved, but the important Pittsburgh market is slightly weaker.

Exports along the Atlantic seaboard are suffering delays because of a tight boat situation. Brokers continue to accumulate at an unchanged pace, however, in expectation of better shipping facilities in the near future.

Pittsburgh

Due to absence of consumer buying, this market is showing a weakening tendency. The \$16 price for No. 1 steel, however, remains unchanged. Steel works are fairly well stocked with scrap and it is not expected that they will be in the market before the first of the month. While there has been some selling at \$15.75 during the past few weeks, the tonnage has been insufficient to change the market price. Brokers and dealers who are covering sales made in the past are not having any difficulty picking up supplies, al-

though heavy melting steel is far from plentiful.

Chicago

Railroad offerings are heavy, and are led by the Rock Island, which is selling 65 cars of heavy melting steel. Included in the lists are those of the Illinois Central, Burlington-Alton, and the Missouri-Kansas-Texas and the Frisco lines at St. Louis. Brokers with orders are less inclined to take new business at current levels and the belief is growing that the underlying structure of the market is strengthening and that higher prices will prevail within 30 to 60 days. Foundry grades are moving in excellent volume, and local mills are pressing for shipments against old commitments.

Cleveland

Some activity has developed in Youngstown, where consumer purchases of No. 1 at \$16 and compressed sheet steel at \$15.50 are reported. No new consumer demand has developed in Cleveland, and, although local mills have made no purchases for 60 days, recent prices are being generally maintained. However, No. 1 busheling has declined 50c. a ton. Dealers are finding it easier to buy scrap at the quoted prices.

Philadelphia

Several sellers here are confident that the market is strong at quoted price levels, but, notwithstanding, they would welcome a No. 1 sale in order to verify their attitude. Bethlehem is purchasing steadily for delivery to three district plants, but other mills are discounting their needs and attempting to show as little interest in replacement orders as is possible. Furthermore, Alan Wood has taken off a furnace and is delaying certain No. 2 shipments on old orders. Harrisburg is taking heavy deliveries, No. 1 and

No. 2 continue to go into Coatesville on old orders and the Claymont No. 1 order is being liquidated at a moderate pace. No. 1 railroad wrought is up \$1, based on a recent sale, and \$13.50 has been paid for No. 1 forge fire.

Buffalo

The largest district consumer came into the market for 30,000 to 40,000 tons of various grades of scrap, the largest single purchase in years. It is reported that the mill paid \$14.50 for lots of 5000 tons or more and \$14 for lots of less than 5000 tons. This was the No. 1 heavy melting steel price with various differentials on No. 2, old and new hydraulic compressed sheets, No. 1 busheling and drop forge flashings.

Boston

Delay in steamer arrivals slowed up the scrap market during the week. Certain exporters are holding up purchases due to uncertainty regarding space. Prices, however, are holding at quoted top levels. Easing of No. 1 steel prices at Pittsburgh and a cancellation of a \$15.50 a ton contract by brokers are without effect on values here. New England foundries are taking machinery cast in good total volume, but individual orders usually are small.

New York

The City of New York offered 1500 tons of scrap girder rails last week and Globe Sales & Mfg. Co. was high bidder at \$11.42, on the ground. This price is considerably above what many old material buyers were willing to pay, and many members of the trade do not consider \$11.42 as representative of the market. Exporters are having a little difficulty in securing boats, and dealer accumulations are building up at a fair rate. Dealers can easily secure \$10 for No. 1 alongside barges and very firm offers are available both in New York and Jersey City for steel and cast shipments into eastern Pennsylvania.

St. Louis

A leading East Side mill lifted a three weeks' embargo on contract shipments of scrap iron during the week, inasmuch as receipts have been running ahead of consumption. While offerings by dealers are light, railroad lists are heavy. The St. Louis-San Francisco is offering 3000 tons; the Missouri-Kansas-Texas has 1000 tons, and the Nashville, Chattanooga & St. Louis asks bids on 15 carloads. The Chicago, Burlington & Quincy has a list of 1200 tons, none of which is expected to come into this market. Mills expected to re-enter the market within the next week or ten days. No. 2 heavy melting is 25c. lower, otherwise the market is unchanged.

Detroit

The market here is still weak, but pressure is easing up and prices are expected to level out and be maintained for some time. Although a great deal of scrap is being offered at the present time owing to peak operations in automobile plants, all available supplies are being absorbed at a good rate.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	14.00 to 14.50
No. 2 RR. wrought.	15.50 to 16.00
Scrap rails	15.75 to 16.25
Rails, 3 ft. and under.	16.50 to 17.00
Comp. sheet steel.	15.50 to 16.00
Hand bundled sheets.	14.00 to 14.50
Hvy. steel axle tngs.	13.50 to 14.00
Machine shop tngs.	10.50 to 11.00
Short shov. tngs.	10.50 to 11.00
Mixed bor. tngs.	8.25 to 9.25
Cast iron borings.	10.50 to 11.00
Cast iron carwheels.	14.00 to 14.50
Hvy. breakable cast.	13.00 to 13.50
No. 1 cast	15.00 to 15.50
RR. knuckles & cplrs.	17.25 to 17.75
Rail, coil & leaf springs.	17.25 to 17.75
Rolled steel wheels.	17.25 to 17.75
Low phos. billet crops.	18.00 to 18.50
Low phos. sh. bar.	17.50 to 18.00
Low phos. punchings.	17.00 to 17.50
Low phos. plate scrap.	17.00 to 17.50
Steel car axles	16.00 to 16.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel.	13.50 to 14.00
Light bund. stampings	10.00 to 10.50
Drop forge flashings.	13.00 to 13.50
Machine shop turn.	8.50 to 9.00
Short shov. turn.	8.75 to 9.25
No. 1 busheling	13.00 to 13.50
Steel axle turnings.	13.00 to 13.50
Low phos. billet crops	17.50 to 18.00
Cast iron borings.	9.00 to 9.50
Mixed bor. & turn.	9.00 to 9.50
No. 2 busheling	9.00 to 9.50
No. 1 cast	15.00 to 15.50
Railroad grate bars.	8.00 to 8.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.50 to 18.00
Rails for rolling.	17.00 to 17.50
Railroad malleable.	17.75 to 18.50
Cast iron carwheels.	15.00

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$13.50 to \$14.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Hydraulic bund., new.	13.00 to 13.50
Hydraulic bund., old.	10.50 to 11.00
Steel rails for rolling.	15.00 to 15.50
Cast iron carwheels.	14.50 to 15.00
Hvy. breakable cast.	13.50 to 14.00
No. 1 cast	14.00 to 14.50
Stove plate (steel wks)	11.50 to 12.00
Railroad malleable	17.50 to 18.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace.	6.25
Cast borings	6.00
Heavy axle turnings.	11.50 to 12.00
No. 1 low phos. hvy.	17.00 to 17.50
Couplers & knuckles.	17.00 to 17.50
Rolled steel wheels.	17.00 to 17.50
Steel axles	16.50 to 17.00
Shafting	19.00 to 19.50
No. 1 RR. wrought.	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
Bundled sheets	11.00 to 11.50
No. 1 forge fire	13.00 to 13.50
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered Chicago district consumers:

Hvy. mltng. steel.	\$14.25 to \$14.50
Auto. hvy. mltng. steel	12.00 to 12.50
Shoveling steel	14.00
Hydraul. comp. sheets.	13.25 to 13.75
Drop forge flashings.	12.00 to 12.50
No. 1 busheling	13.00 to 13.50
Rolled carwheels	15.50 to 16.00
Railroad tires	16.00 to 16.50
Railroad leaf springs.	15.50 to 16.00
Axle turnings	12.75 to 13.25
Steel coup. & knuckles	15.50 to 16.00
Coil springs	16.00 to 16.50
Axle turn. (elec.)	13.75 to 14.25
Low phos. punchings.	16.00 to 16.50
Low phos. plates, 12 in. and under	16.00 to 16.50
Cast iron borings	6.75 to 7.25
Short shov. turnings.	7.25 to 7.75
Machine shop turn.	7.00 to 7.50
Rerolling rails	15.25 to 15.75
Steel rails under 3 ft.	16.75 to 17.25
Steel rails under 2 ft.	17.25 to 17.75
Angle bars, steel.	15.75 to 16.25
Cast iron carwheels.	14.00 to 14.50
Railroad malleable	17.00 to 17.50
Agric. malleable	14.50 to 15.00

Per Net Ton

Iron car axles	\$18.00 to \$18.50
Steel car axles	14.75 to 15.25
No. 1 RR. wrought.	13.00 to 13.50
No. 2 RR. wrought.	12.25 to 12.75

No. 2 busheling, old.	\$7.50 to \$8.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.00 to 8.50
No. 1 machinery cast.	12.50 to 13.00
Clean auto. cast.	12.00 to 12.50
No. 1 railroad cast.	11.50 to 12.00
No. 1 agric. cast.	10.50 to 11.00
Stove plate	8.00 to 8.50
Grate bars	8.50 to 9.00
Brake shoes	9.00 to 9.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	12.50 to 13.00
Scrap rails	13.50 to 14.00
New hy. bndles sheets.	12.50 to 13.00
Old hydraul. bundles.	11.50 to 12.00
Drop forge flashings.	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Hvy. axle turnings.	12.00 to 12.50
Machine shop turn.	8.00 to 8.50
Knucklers & Couplers	16.00 to 16.50
Coil & leaf springs.	16.00 to 16.50
Rolled steel wheels.	16.00 to 16.50
Low phos. billet crops	16.50 to 17.00
Short shov. turnings.	8.25 to 8.75
Mixed bor. & turn.	8.25 to 8.75
Cast iron borings.	8.25 to 8.75
No. 2 bushelings	7.00
Steel car axles	14.00 to 14.50
Iron axles	12.50 to 13.00
No. 1 machinery cast.	13.50 to 14.00
No. 1 cupola cast.	12.50 to 13.00
Stove plate	11.00 to 11.50
Steel rails, under 3 ft.	16.00 to 16.50
Cast iron carwheels.	12.00 to 12.50
Railroad malleable	16.25 to 16.75
Chemical borings	9.00 to 9.50

BIRMINGHAM

Per gross ton delivered consumers' yards:

Hvy. melting steel.	\$11.00 to \$11.50
Scrap steel rails.	11.50 to 12.00
Short shov. turnings.	7.00
Stove plates	8.00
Steel axles	12.00 to 12.50
Iron axles	12.00 to 12.50
No. 1 RR. wrought.	8.50 to 9.00
Rails for rolling	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Tramcar wheels	11.00 to 12.00

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:

Selected hvy. steel.	\$12.50 to \$13.00
No. 1 hvy. melting.	12.25 to 12.75
No. 2 hvy. melting.	10.75 to 11.25
No. 1 locomotive tires.	11.00 to 11.50
Misc. stand-sec. rails.	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought.	12.25 to 12.75
No. 1 busheling	7.50 to 8.00
Cast bor. & turn.	4.50 to 5.00
Rails for rolling	13.75 to 14.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	9.25 to 9.75
Steel car axles	13.00 to 13.50
Iron car axles	15.00 to 16.00
No. 1 RR. wrought.	10.50 to 11.00
Steel rails under 3 ft.	13.50 to 14.00
Steel angle bars	13.00 to 13.50
Cast iron carwheels.	11.00 to 11.50
No. 1 machinery cast.	11.25 to 11.75
Railroad malleable.	14.25 to 14.75
No. 1 railroad cast.	11.25 to 11.75
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$11.75 to \$12.25
No. 2 hvy. mltng. steel.	9.75 to 10.25
Scrap rails for mltng.	11.25 to 11.75
Loose sheet clippings.	7.25 to 7.75
Bundled sheets	8.75 to 9.25
Cast iron borings.	6.75 to 7.25
Machine shop turn.	7.50 to 8.00
No. 1 busheling.	9.25 to 9.75
No. 2 busheling.	5.00 to 5.50
Rails for rolling	11.75 to 12.25
No. 1 locomotive tires	10.25 to 10.75
Short rails	14.75 to 15.25
Cast iron carwheels	11.25 to 11.75
No. 1 machinery cast.	12.25 to 12.75
No. 1 railroad cast.	11.50 to 12.00
Burnt cast	8.50 to 9.00
Stove plates	8.50 to 9.00
Agricul. malleable	10.50 to 11.00
Railroad malleable	12.25 to 12.75

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$10.75 to \$11.25
No. 2 hvy. mltng. steel.	9.75 to 10.25
Borings and turnings.	6.25 to 6.75
Long turnings	6.25 to 6.75
Short shov. turnings.	6.75 to 7.25
No. 1 machinery cast.	\$14.50 to \$15.00

Automotive cast	\$13.75 to \$14.25
Hydraul. comp. sheets	11.50 to 12.00
Stove plate	8.75 to 9.25
New factory bushel.	10.25 to 10.75
Old No. 2 busheling.	5.75 to 6.25
Sheet clippings	8.50 to 9.00
Flashings	10.00 to 10.50
Low phos. plate scrap.	11.00 to 11.50

CANADA

Dealers' buying prices per gross ton:

	Toronto	Mon-treal
Hvy. melting steel.	\$7.50	\$7.00
Rails, scrap	8.50	8.00
Machine shop turn.	4.00	4.00
Boiler plate	7.00	6.00
Hvy. axle turnings.	4.50	4.00
Cast borings	5.00	4.50
Steel borings	4.00	4.00
Wrought pipe	4.50	4.00
Steel axles	8.50	9.00
Axles, wrought iron.	9.00	9.50
No. 1 machinery cast.	11.50	11.00
Stove plate	7.50	7.00
Standard carwheels	11.00	10.50
Malleable	7.00	7.00
Shoveling steel	6.50	6.00
Bushelings	6.00	5.50
Compressed sheets	6.50	6.00

YOUNGSTOWN

Per gross ton delivered consumers' yards:

No. 1 hvy. mltng. steel.	\$15.25 to \$15.75
Hydraulic bundles	15.25 to 15.75
Machine shop turn.	11.50 to 11.75

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$9.50 to \$10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Hvy. breakable cast.	9.00 to 9.50
No. 1 machinery cast.	10.00 to 10.50
No. 2 cast	8.75 to 9.00
Stove plate	7.25 to 7.50
Steel car axles	13.50 to 14.00
Shafting	14.50 to 14.75
No. 1 RR. wrought.	9.50 to 10.00
No. 1 wrought long.	8.50 to 9.00
Spec. iron & steel pipe	8.50 to 9.00
Forge fire	7.50 to 8.00
Rails for rollings.	11.00 to 12.00
Short shov. turnings.	5.00 to 5.50
Machine shop turn.	4.50 to 5.00
Cast borings	4.50 to 5.00
No. 1 blast furnace.	3.00 to 3.50
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap.	6.25 to 6.75

Per gross ton, delivered local foundries:

No. 1 machin cast.	\$12.00
No. 1 hvy. cast cupola.	10.00
No. 2 cast	8.50

Add 50c. to 75c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$9.40 to \$9.90
Scrap rails	9.40 to 9.90
No. 2 steel	8.75 to 9.00
Breakable cast	8.25 to 8.75
Machine shop turn.	4.40 to 4.50
Bund. skeleton, long.	7.75 to 7.80
Shafting	13.75 to 14.00
Engine blocks, strip.	9.25 to 9.75
Cast bor., chemical.	5.00 to 7.00
Cotton ties	6.25 to 6.50

Per gross ton delivered consumers' yards:

Textile cast	\$10.50 to \$11.00
No. 1 machin. cast.	10.50 to 11.00
Stove plate	9.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	\$9.50 to \$10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
No. 2 cast.	8.50 to 8.75
Stove plate	7.25 to 7.50
Rails (scrap)	11.00 to 11.25

Philadelphia, on cars at

Port Richmond

No. 1 heavy melting steel... \$13.00

Boston, on cars at Army Base

or Mystic Wharf

No. 1 hvy. mltng. steel. \$11.50 to \$12.00
No. 2 hvy. mltng. steel. 10.50 to 11.00
Ralls (scrap) 11.50 to 12.00
Machine shop turn. 6.00 to 6.25
Stove plate 7.50 to 7.75

New Orleans, on cars at

Stuyvesant Dock

No. 1 hvy. mltng. steel. \$11.00 to \$11.50
No. 2 hvy. mltng. steel. 10.00 to 10.50

Los Angeles, on cars or trucks

at local piers

No. 1 hvy. mltng. steel. \$10.75 to \$11.25
Compressed bundles 8.75 to 9.25

RAW AND SEMI-FINISHED STEEL

Billets, Blooms and Slabs	
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.	
	<i>Per Gross Ton</i>
Rerolling	\$28.00
Forging quality	35.00
Delivered Detroit	
Rerolling	\$31.00
Forging	38.00
Billets Only F.o.b. Duluth	
Rerolling	\$30.00
Forging	37.00
Sheet Bars	
F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.	
	<i>Per Gross Ton</i>
Open-hearth or Bessemer	\$28.00

Skelp	
F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.	
	<i>Per Lb.</i>
Grooved	1.80c.
Universal	1.80c.
Sheared	1.80c.
Wire Rods	
(Nos. 4 and 5)	
	<i>Per Gross Ton</i>
F.o.b. Pittsburgh	\$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

FINISHED IRON AND STEEL

BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Duluth	2.00c.
Del'd Detroit	2.00c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
Del'd Philadelphia	2.16c.
Del'd New York	2.20c.
F.o.b. Birmingham	2.00c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars Pacific ports	2.40c.

Rail Steel	
(For merchant trade)	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron	
F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

*In quantities of 10,000 to 19,999 lb.

Plates	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.99c.
Del'd New York	2.09c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates	
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling	
	<i>Base per Lb.</i>
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill	
Standard rails, heavier than 60 lb. per gross ton	\$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points	
Light rails (from billets) per gross ton	\$35.00
Light rails (from rail steel) per gross ton	34.00

Base per 100 Lb.	
Spikes, 9/16 in. and larger	\$2.60
Spikes, ½ in. and smaller	2.60
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.60
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	
Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.	

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets	
	<i>Hot Rolled</i>
	<i>Base per Lb.</i>
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Philadelphia	2.16c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.45c. to 2.60c.
No. 24, del'd Philadelphia	2.71c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, f.o.b. Detroit	2.70c.
No. 10 gage, del'd Philadelphia	2.81c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Philadelphia	3.26c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets	
No. 24 gage, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Philadelphia	3.41c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. cars dock Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes	
No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock	
No. 20, f.o.b. Pittsburgh	2.95c.
No. 20, f.o.b. Gary	3.05c.
No. 20, f.o.b. Birmingham	3.55c.
No. 20, f.o.b. cars dock Pacific ports	3.55c.
No. 10, f.o.b. Pittsburgh	2.35c.
No. 10, f.o.b. Gary	2.45c.
No. 10, f.o.b. Birmingham	2.95c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific Coast ports	3.35c.

Tin Plate	
	<i>Base per Box</i>
Standard cokes, f.o.b. Pittsburgh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate	
(F.o.b. Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.	
	<i>Base per Lb.</i>
All widths up to 24 in., P'gh.	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.85c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.40c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	\$2.10
Smooth coated nails	2.10

	Base per 100 Lb.
Annealed fence wire	\$2.65
Galvanized fence wire	3.00
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Twisted barbless wire	2.60
Woven wire fence, base column	\$58.00
Single loop bale ties, base column	51.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/4	57 37	1/4	91 1/2 + 138
1/2	60 44 1/2	1/2	94 1/2 + 15 1/2
3/4	64 1/2 55	3/4	91 1/2 15
1	67 1/2 59	1	96 1/2 20 1/2
1 1/2	69 1/2 61 1/2	1 1/2	99 1/2 25 1/2
2		2	104 1/2 28
		2 1/2	111 1/2 26

Lap Weld

2	62 53 1/2	2	37 22 1/2
2 1/2	3.65 56 1/2	2 1/2	37 38 25
3 1/2	6.67 58 1/2	4	8.40 28 1/2
7	8.66 56 1/2	9	12.33 24 1/2
9	10.65 56 1/2		
11	12.64 55		

Butt Weld, extra strong, plain ends

1/4	55 1/2 42 1/2	1/4	91 1/2 + 13 + 45 1/2
1/2	57 1/2 46 1/2	1/2	94 1/2 + 15 1/2 + 34 1/2
3/4	62 1/2 54 1/2	3/4	91 1/2 17 1/2
1	66 1/2 58 1/2	1	96 1/2 22 1/2
1 1/2	68 1/2 61	1 1/2	99 1/2 29

Lap Weld, extra strong, plain ends

2	60 52 1/2	2	40 26
2 1/2	3.64 56 1/2	2 1/2	4 45 1/2 33
3 1/2	6.67 60	4 1/2	6 45 33 1/2
7	8.66 57	7	8 46 33
9	10.65 56	9	12.41 30
11 and 12	64 1/2 55		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	\$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in., Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, \$3 extra.	

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$39. Birmingham, and \$47.40, delivered Chicago and 4-in. pipe, \$42, Birmingham, and \$50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller	70, 10 and 5
Larger than 1/2 in.	70 and 10
Lag bolts	70 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 10
Hot-pressed nuts, blank or tapped, square	70 and 10
Hot-pressed nuts, blank or tapped, hexagon	70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl.	
1 in. diameter	60, 20 and 15
Larger than 1 in. diameter	60, 20 and 15
Stove bolts in packages, Pittsburgh	72 1/2 and 10
Stove bolts in packages, Chicago	72 1/2 and 10
Stove bolts in packages, Cleveland	72 1/2 and 10
Stove bolts in bulk, Pittsburgh	82 1/2
Stove bolts in bulk, Chicago	82 1/2
Stove bolts in bulk, Cleveland	82 1/2
Tire bolts	55

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/4 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Uncropped\$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is \$52. F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base2.45c. Delivered price at Detroit is ..2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1 1/2% Nickel)	\$0.25
2100 (2 1/2% Nickel)	0.95
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel...base	
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	\$0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.03 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/4c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

Base per Lb.

High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Prices are same for warehouse distribution to all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

British and Continental Prices BRITISH

Per Gross Ton f.o.b. United Kingdom-Ports

Based on exchange rate as of April 13.

Ferromanganese, export	\$44.48
Billets, open-hearth	29.03 to \$30.27
Tin plate, per base box	4.63 to 4.99
Steel bars, open-hearth	38.91
Beams, open-hearth	37.69
Channels, open-hearth	38.91
Angles, open-hearth	37.69
Black sheets, No. 24 gage	47.07
Galvanized sheets, No. 24 gage	59.96

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports Based on exchange rate of April 13.

Billets, Thomas	\$19.22
Wire rods, No. 5 B.W.G.	36.81
Steel bars, merchant	26.58
Sheet bars	19.63
Plate, 1/4 in. and up	35.38
Plate, 3/16 in. and 5 mm.	34.76
Sheets, 1/4 in.	36.81
Beams, Thomas	25.56
Angles (Basic)	32.71
Hoops and strip base	43.97
Wire, plain, No. 8	47.03
Wire nails	47.03
Wire, barbed, 4 pt. No. 10 B.W.G.	70.57

PIG IRON AND RAW MATERIALS

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.....	\$20.50
Delivered Boston Switching District	21.00
Delivered Brooklyn.....	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia.....	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.....	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati.....	20.5807
Delivered Canton, Ohio.....	20.8482
Delivered Columbus, Ohio.....	21.64
Delivered Mansfield, Ohio.....	21.3832
Delivered Indianapolis.....	21.9289
Delivered South Bend, Ind.....	21.6935
Delivered Milwaukee.....	20.57
Delivered Davenport, Iowa.....	21.3832
Delivered Kansas City.....	22.2178
F.o.b. Duluth.....	20.00
Delivered St. Paul.....	21.94
F.o.b. Provo, Utah.....	17.50
Delivered San Francisco, Los Angeles or Seattle.....	22.315
F.o.b. Birmingham*.....	15.50

*Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.; Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.....	\$20.00
Delivered Boston Switching District	20.50
Delivered Newark or Jersey City	21.4873
Delivered Philadelphia.....	20.8132
F.o.b. Buffalo.....	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.....	19.00
Delivered Cincinnati.....	20.0807
Delivered Canton, Ohio.....	20.3482
Delivered Mansfield, Ohio.....	20.8832
F.o.b. Jackson, Ohio.....	20.75
F.o.b. Provo, Utah.....	17.00
F.o.b. Birmingham.....	14.50

Bessemer

F.o.b. Everett, Mass.; Bethlehem, Birdsboro and Swedeland, Pa.....	\$21.50
Delivered Boston Switching District	22.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia.....	22.3132
F.o.b. Buffalo and Erie, Pa. and Duluth.....	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Birmingham.....	20.00
Delivered Cincinnati.....	21.0807
Delivered Canton, Ohio.....	21.3482
Delivered Mansfield, Ohio.....	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$24.00
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Gray Forge

Valley furnace	\$19.00
Pittsburgh district furnace.....	19.00

Charcoal

Lake Superior furnace	\$22.00
Delivered Chicago	25.2528
Delivered Buffalo	25.595

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75.....	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25.....	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Domestic, 80% (carload).....	\$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%.....	\$26.00
50-ton lots 3-mo. shipment..	24.00
F.o.b. New Orleans.....	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	130.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6.00 to 6.50%	\$22.75
6.51 to 7.00%	23.25
7.01 to 7.50%	23.75
7.51 to 8.00%	24.25
8.01 to 8.50%	24.75
8.51 to 9.00%	25.25
9.01 to 9.50%	25.75
9.51 to 10.00%	26.25
10.01 to 10.50%	26.75
10.51 to 11.00%	27.25
11.01 to 11.50%	27.75
11.51 to 12.00%	28.25

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10.00 to 10.50%	\$27.75
10.51 to 11.00%	28.25
11.01 to 11.50%	28.75
11.51 to 12.00%	29.25
12%	30.25
13%	31.75
14%	33.25
15%	34.75
16%	36.25
17%	37.75

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads.....	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrocromium, 2% carbon	16.50c. to 17.00c.
Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocantitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocantitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton.....	45.50
Silico-manganese, gross ton, delivered.....	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron..	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron...	4.40

Foreign Ore

C.I.F. Philadelphia or Baltimore

	<i>Per Unit</i>
Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria	10.25c.
Iron, low phos., Swedish, average, 68½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron.....	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron.....	Nominal
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	25c.
Manganese, African, Indian, 49-51%	26c.
Manganese, Brazilian, 46 to 48½%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered, nominal..	\$16.00
Tungsten, domestic, scheelite delivered, nominal.....	16.00

Per Gross Ton

Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f. Atlantic Seaboard (African) ..	\$17.50
45 to 46% Cr ₂ O ₃ (Turkish) ..	\$16.50 to 17.00
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish).....	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	22.00
52% Cr ₂ O ₃ (Turkish).....	21.75
48 to 49% Cr ₂ O ₃ (Turkish)...	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all rail shipment..	\$18.00
Domestic, barge and rail shipment	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines.....	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid....	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines...	35.00

FUEL OIL

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.25c.
No. 4 industrial.....	3.87½c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.25c.
No. 4 industrial.....	3.87½c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil.....	5.00c.
No. 5 industrial fuel oil.....	3.77c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	6.00c.
No. 4 industrial.....	5.75c.
No. 5 industrial.....	5.25c.

COKE AND COAL

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	\$3.65 to \$3.80
Foundry, f.o.b. Connellsville Prompt	4.25 to 5.75
Foundry, by-product, Chicago outside switching district	9.00
Foundry, by-product, delivery in Chicago switching district	9.75
Foundry, by-products, New England, delivered	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.65
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, Cleveland, delivered	9.75
Foundry, by-product, Cincinnati, del'd	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.90 to 2.10
Gas coal, 1/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

REFRACTORIES

Fire Clay Brick		
	Per 1000 f.o.b. Works	
	High-heat	Inter-mediate
	Duty	Duty
	Brick	Brick
Pennsylvania	\$45.00	\$40.00
Maryland	45.00	40.00
New Jersey	50.00	43.00
Ohio	40.00	35.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	\$48.00 to 50.00
Silica cement per net ton	8.00

Chrome Brick	
	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	\$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick	
	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	\$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite	
	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.95c.
Cold-finished and screw stock:	
Rounds and hexagons	3.35c.
Squares and flats	3.35c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	3.10c.
Track bolts, all sizes, per 100 count	65 per cent off list
Machine bolts, 100 count	65 per cent off list
Carriage bolts, 100 count	65 per cent off list
Nuts, all styles, 100 count	65 per cent off list
Large rivets, base per 100 lb.	\$3.80
Wire, black, soft ann'd, base per 100 lb.	2.90c.
Wire, galv. soft, base per 100 lb.	3.25c.
Common wire nails, per keg	2.35c.
Cement coated nails, per keg	2.35c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.
	Per Cent Off List
Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87 1/2
Cut point set screws	75 and 10
Flat head bolt wood screws	70
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
Black ann'd wire per 100 lb.	\$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.

Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled: strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	Special
Long terme sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x 1/4 in. and larger	3.75c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
†Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.76c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.50c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	†3.00c.

Hot-rolled annealed sheets (No. 24).....	3.91c.
Galvanized sheets (No. 24)....	4.61c.
Hot-rolled sheets (No. 10)....	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.\$2.40	
*No. 9 galv. wire, per 100 lb....	2.75
*Com. wire nails, base per keg..	2.35

†Outside delivery 10c. less.
*For 5000 lb. or less.

CINCINNATI

Base per Lb.	
Plates and struc. shapes.....	3.42c.
Bars, rounds, flats and angles.	3.22c.
Other shapes.....	3.37c.
Rail steel reinfo. bars.....	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars.....	3.72c.
Hot-rolled annealed sheets (No. 24).....	4.02c.
Galv. sheets (No. 24).....	4.72c.
Hot-rolled sheets (No. 10)....	3.22c.
Structural rivets.....	4.35c.
Small rivets.....	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over).....	\$2.88
Com. wire nails, base per keg: Any quantity less than carload..	3.04
Cement c'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.....	8.35
Net per 100 Ft.	
Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

Base per Lb.	
Plates	3.88c.
Struc. shapes.....	3.25c.
Soft steel bars.....	3.05c.
Reinforcing bars.....	2.60c.
Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.55c.
Cold-rolled strip steel.....	3.19c.
Hot-rolled annealed sheets (No. 24).....	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide).....	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg..\$3.15	
Black wire, base per 100 lb. (2500-lb. lots or under)	3.50
(Over 2500 lb.)	3.40

BOSTON

Base per Lb.	
Beams, channels, angles, tees, zeos	3.54c.
H beams and shapes	3.54c.
Plates—Sheared, tank, and univ. mill, 1/4 in. thick and heavier	3.56c.
Floor plates, diamond pattern.	5.36c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga	5.85c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.	
Soft steel bars	3.09c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.

Galvanized sheets (No. 24)**..	4.72c.
Bands	3.39c.
Hoops	3.39c.
†Cold-finished bars	3.64c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts, in cases, 70 and 10 per cent off list	
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.
†With reduction in chemical extras.

**0.25c. off list for 10 to 25 bundles; 0.50c. for 25 bundles and over, Detroit delivery only.

MILWAUKEE

Base per Lb.	
Plates and structural shapes..	3.31c.
Soft steel bars, rounds up to 8 in., flats and fillet angles....	3.11c.
Soft steel bars, squares and hexagons	3.26c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)....	3.16c.
Hot-rolled annealed 3/16—24 in. to 48 in. wide incl.	3.41c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 20)	4.66c.
Cold-finished steel bars.....	3.61c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots) ..	3.86c.
Boiler rivets, cone head (keg lots)	3.96c.
Track spikes (keg lots)	3.91c.
Track bolts (keg lots)	4.91c.
Black annealed wire	3.15c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

Per Cent Off List

Machine bolts, 1/2x6 and smaller...70	
Larger than 1/2x6.....	65 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots) ..	65 and 10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.	
Mild steel bars, rounds	3.25c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	4.02c.
Bands and hoops	3.55c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24.....	4.50c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.	
*Mild steel bars	3.00c.
**Reinforcing bars	2.85c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10....	3.10c.
†Hot-rolled annealed sheets, No. 24	3.60c.
†Galvanized sheets, No. 24....	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.78c.
§Cold-rolled squares, hex. and flats	3.78c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply.
†Quantity extras per thickness apply.
Hot-rolled quantity extras are: 2000

lb. and over, base: 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb. add 30c.; 0 to 999 lb., add 50c.

125 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add \$1.00; for 0 to 299 lb. add \$1.75; for combined order under 100 lb. add \$3.00.

**For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

Base per Lb.	
Mild steel bars	3.36c.
Iron bars	3.36c.
Reinforcing bars	3.36c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10.....	3.36c.
Hot-rolled annealed sheets No. 24	4.16c.
Galvanized sheets, No. 24.....	4.86c.
Steel bands	3.61c.
Cold-finished bars	4.13c.

MEMPHIS

Base per Lb.	
Mild steel bars	3.47c.
Shapes, bar size	3.47c.
Iron bars	3.47c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10.....	3.47c.
Hot-rolled annealed sheets, No. 24	4.27c.
Galvanized sheets, No. 24	4.80c.
Steel bands	3.72c.
Cold-drawn rounds	3.89c.
Cold-drawn flats, squares, hexagons	5.89c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list.	50

NEW ORLEANS

Base per Lb.	
Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.30c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.65
Bolts and nuts, per cent off list	70

PACIFIC COAST

Base per Lb.			
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.25c.	3.60c.	3.55c.
Shapes, standard	3.25c.	3.60c.	3.55c.
Soft steel bars.	3.25c.	3.60c.	3.70c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports..	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.00c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.35c.	3.70c.	3.75c.
Galv. sheets (No. 24)	4.50c.	4.95c.	5.00c.
Cold finished steel			
Rounds	5.80c.	5.85c.	6.00c.
Squares and hexagons.	7.05c.	7.10c.	7.25c.
Flats	7.55c.	7.60c.	8.25c.
Common wire nails—base per keg less carload	\$3.20	\$3.20	\$3.20

All items subject to differentials for quantity.



THIS WEEK'S MACHINE TOOL ACTIVITIES

... Price advances stimulate radial drill orders.

o o o

... Germany wants American machine tools

o o o

*... Eastern and mid-western areas speed up buying
while Detroit takes on delivery worries.*

o o o

By L. M. WAITE

o o o

WHILE there are plenty of discouraging factors in the immediate processes of navigating business courses, it is outstanding that purchases of machine tools over increasingly wide areas and by both large and small users offer great encouragement as to general betterment. With disturbing military activity in the Far East and in Africa, plus a gripping European tension, our own national viewpoint is much relieved because of modernization effort indicated through sustained machine tool buying.

Eastern

Careful checking indicates a minimum of 30 radial drills, in all sizes, ordered by possibly 18 eastern shops during the final few days prior to April 16, when price increases went into effect on outstanding quotations. This is interesting from angle of buyer recognition that advances are justified, and of orders either in hand or in sight to warrant so much eastern buying of a particular type of tool.

New England

In addition to a reasonable satisfactory volume of orders for standard machines during the past 10 days, the Boston district has ordered a number of specialized equipments of heavy design. Buyers

have included large organizations. Pratt & Whitney Co., Hartford, Conn., has been active in some equipment buying and in entering Government orders for airplane engines.

Metropolitan

The past 10 days have made it evident that Eastern manufacturers are not going to let other areas corral all preferred machine tool deliveries. Larger buyers have included General Electric Co., American Locomotive Co., American Car & Foundry Co., American Smelting & Refining Co., and Worthington Pump & Machinery Corp. In addition to these, several organizations have covered equipment needs for types of machines which fit into already established lines on a non-competitive order basis. The New York Board of Transportation is expected to make awards immediately for some \$100,000 in shop equipment for the Independent Subway System. General Electric Co. is said to be studying proposals on a list for oil burner and air conditioning departments at Bloomfield, N. J.

Detroit

With large-scale machinery purchases and rehabilitation programs pretty well out of the way for automotive summer requirements, local

dealer activity will now enter the routine of intermediary in connection with speeding up shipments. This period is always an expensive and delicate one for the dealer; it seems however, to be an expected part of dealer service. Packard is proceeding with order placing at a rather slow pace. Chevrolet has ironed out its Flint program to a large extent and is concentrating on the transmission plant at Saginaw where gear cutting and housing units are said to have been pretty well settled.

Cincinnati

Buying orders against the many drilling machine propositions which have been pending for some little time feature a decided optimism for the week. Average bookings have stepped April up slightly. Heavy machine demand has increased; this, coupled with drilling equipment activity, indicates a gathering momentum. Milling and grinding requirements showed a slight decline over the previous April rush.

Cleveland

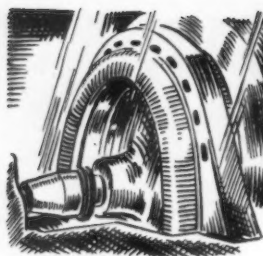
Machine tool business continues in fair volume from miscellaneous sources and inquiry shows some gain. Calls for turret lathe information, largely single machines, are very active and well distributed. Automotive inquiries are slack.

Chicago

The price situation has settled down and the buying stage is being reached on many propositions which have been pending for some time. This fact is serving to bring out a volume of new inquiries. The Santa Fe is reported as ready to close on the remainder of its list. Stewart-Warner Corp., Chicago, continues to buy piece-meal in getting its list out of the way. A general tone of encouragement prevails now that the buying hesitancy of the past few weeks is seemingly recognized as a mistake which may be felt from the angle of deliveries.

Foreign—Germany

The opinion has been ventured that increasing European complications may force Germany to find the way to modify her barter pay restrictions against machine tools manufactured within countries with which she has no industrial treaties of a preference nature, including, of course, The United States of America. Industrial anxiety to secure certain types of American machine tools, utilized in large production, may prove to be the wedge means by which the barter blockade will pass into history.



NON FERROUS

... Domestic copper sales in April total 152,825 tons.

o o o

... Zinc in strong position, as livelier interest develops.

NEW YORK, April 21.—Following application of the 9.50c. copper price on April 14, sales in the domestic market have been light and only routine business occupies the attention of the trade. On the day before the higher quotation took effect, 63,191 tons was sold, or slightly more than the 63,054 tons booked in the preceding three days of active trading. In view of this tremendous tonnage now held under contract, it is felt that the market is facing a prolonged quiet interval. Leading producers point, however, to the strong technical improvement in their position as a result of heavy stock reductions. Weekend sales amounted to 764 tons, and yesterday 521 tons was booked. The month's total through that period indicated orders of 152,825 tons. Accordingly, 4735 tons have been marketed so far at the 9.50c. level. Demand for export copper is said to have receded, with export producers agreeing that the price at present is equivalent to approximately 9.20c. a lb., c.i.f., usual European base ports.

Lead

Sales last week are believed to have aggregated about 5500 tons, a moderate increase over the preceding period. Stimulated by expanding volume of motor car production, demand from battery makers is said to be brisk. Continued activity in this field, combined with a number of other factors, should maintain the market's current steadiness, if not better its position. For one thing, a better market for lead pigment seems to be developing as reclamation work proceeds in certain flood and storm-stricken areas. Foil makers also are said to be active inquirers at present. No change in the price has occurred, which is firm at 4.60c. a lb. for domestic pig lead at New York. Although recent buying has been primarily for May coverage, the fact that a portion

of last week's business was for April shipment is considered exceptional in view of the volume of April metal contracted for as the new quarter opened.

Zinc

A further improvement in demand for zinc was reflected in

sales of Prime Western metal, which last week amounted to 5608 tons. Unfilled orders declined 124 tons to 38,577 tons at the week's close, and shipments were accordingly placed at 5732 tons. No change in price has occurred, but at the current 4.90c. level, the market is undoubtedly strong in all directions. A scheme to restrict Tri-State ore production by 20 per cent over the next 10 weeks is scheduled to be placed in operation this week.

Tin

Good buying of tin futures set in toward the close of last week, and has since continued in fair volume. Dealers and importers stated that purchases were stimulated by a declining trend in future quotations. Interest in spot metal was feeble, although a lower market exists in this respect also. Today's price for spot Straits tin at New York is 46.87½c. a lb., down ¼c. from a week ago.

The Week's Prices. Cents Per Pound for Early Delivery

	April 15	April 16	April 17	April 18	April 20	April 21
Electrolytic copper, Conn.*	9.50	9.50	9.50	9.50	9.50	9.50
Lake copper, N. Y.	9.62 ½	9.62 ½	9.62 ½	9.62 ½	9.62 ½	9.62 ½
Straits tin, Spot, New York	47.00	46.50	46.60	46.87 ½	46.87 ½	46.87 ½
Zinc, East St. Louis	4.90	4.90	4.90	4.90	4.90	4.90
Zinc, New York†	5.27 ½	5.27 ½	5.27 ½	5.27 ½	5.27 ½	5.27 ½
Lead, St. Louis	4.45	4.45	4.45	4.45	4.45	4.45
Lead, New York	4.60	4.60	4.60	4.60	4.60	4.60

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-21.00c. a lb., delivered.

Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 13.50c. a lb., New York.

Quicksilver, \$77.00 to \$78.00 per flask.

Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	48.25c. to 49.25c.
Tin, bar	50.25c. to 51.25c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	16.75c.
*High brass sheets	14.87 ½c.
*Seamless brass tubes	17.37 ½c.
*Seamless copper tubes	17.50c.
*Brass rods	13.12 ½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.10c. to 6.10c.
Lead, bar	6.10c. to 7.10c.
Lead, Sheets, cut	8.25c.
Antimony, Asiatic	14.00c. to 15.00c.
Alum., virgin, 99 per cent, pus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ¾	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	51.00c.
Tin, bar	53.00c.

Copper, Lake	10.25c. to 10.50c.
Copper, electrolytic	10.25c. to 10.50c.
Copper, castings	10.00c. to 10.25c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	55.00c.
Solder, ½ and ¾	27.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.25c.	8.00c.
Copper, hvy. and wire	7.12 ½c.	7.62 ½c.
Copper, light and bottoms	6.12 ½c.	6.62 ½c.
Brass, heavy	4.00c.	4.62 ½c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.00c.	6.50c.
No. 1 yel. brass turnings	5.12 ½c.	5.62 ½c.
No. 1 red brass or Lead, heavy	3.50c.	3.87 ½c.
compos. turnings	5.62 ½c.	6.12 ½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87 ½c.
Cast aluminum	12.12 ½c.	12.25c.

Rustless Steels

(CONCLUDED FROM PAGE 27)

sion will be appealed, and if the appeal is successful a certain proportion of the industry would be under the direct control of the new patents for the next 17 years. That is, the industry would be under the control of this patent, or, possibly, answerable to other patents covering the use of columbium, titanium, etc., which, broadly speaking, accomplish the same purpose but at a higher cost.

There are patents pending which cover the use of titanium, vanadium, columbium and tantalum in the analysis of corrosion-resisting steels. Vanadium is expensive and its use may be restricted. The other three metals are somewhat cheaper and are particularly desirable constituents to suppress intergranular corrosion. Therefore, if and when these patents are granted, they would draw royalties (although one may be free) from a sizable proportion of the industry.

The picture then is that a number of basic patents are expiring and a number of new patents are in the offing which singly or as a group will be able to dominate the industry. There is no denying that the entire situation is unsettled and more than confused, with alloy makers not sure just what patents they will be working under or slightly discouraged by the possibility of a number of overlapping patents which will apply to their operations. More than anything else, the average alloy producer wants to view the future with equanimity. He would like to see some semblance of order evolve so that he and his competitors can attempt to operate orderly, efficiently and profitably.

What disorganization which may appear in the patent end of rustless steel manufacture will naturally have some influence on the future status of this branch of the steel industry. In all probability the patent confusion will disappear and some stability ensue, following which time the producers will devote all their energies to producing these valuable alloys more cheaply.

Rustless steels have many distinct advantages over ordinary steels and would automatically encroach upon the established applications of these ordinary steels, as

well as many nonferrous metals, if it were not for their comparatively high base prices. Consumers talk and talk of the necessity of lowering prices and they are abetted in their attitude by the habit of magazines to prophesy the constant reduction of prices and the opening up of potentially enormous markets. Stainless steel at 20c. a lb. would be used in tremendous volumes, but that this price will be attained over the next several decades is extremely unlikely.

The immediate outlook shows little chance of even fractional reductions, for producers are hard pushed to break even at current price levels. The actual cost of contained nickel and chromium is very small as compared with the selling price of the steel. Consequently, reductions in nickel and ferrochrome, although desirable, will not materially reduce the cost of the final product. Neither will new melting methods create any great change unless some entirely new procedure is developed. For the great loss in stainless manufacture is not at the ingot end but occurs near the finishing end. There is little indication that the scrap losses which arise after rolling is well under way will be greatly curtailed in the near future. If these losses are not curtailed, any price reduction must necessarily be reflected in deficits for many makers of certain types of stainless steels. This situation is more pronounced in the casting industry than for rolling mills.

A number of producers are experimenting with new melting methods in order to achieve better steel and perhaps obtain slight cost reductions. A few of these different methods are worthy of mention. For instance, the Rustless Iron Corp., at Baltimore, through the use of the Wild process, has blazed the trail in a new direction by avoiding the use of ferrochrome. Likewise, the Feild process of using lower-priced high-carbon ferrochrome may result in definite savings. One maker is experimenting extensively with the Wiles procedure, which employs hollow electrodes through which finely divided ores mixed with reducing metals are passed. The chemical and thermal reaction at the electrode tips is said to produce very low carbon rustless steels of high quality. Some monetary saving is also claimed. Other mills are experi-

menting in other directions for the same purpose, but their successes and failures are for the most part unknown in view of the highly competitive character of the industry. No enthusiast expects to see high-chrome and chrome nickel steels selling at a price even five times that of carbon steel within the next decade. The entire trade, however, anticipates slight reductions which will keep pace with technological advances. Likewise, moderate reductions may ensue as a natural result of improved production methods or because a constantly increasing volume of rustless steel being manufactured will automatically reduce unit costs.

Bird's Eye View Of America

(CONCLUDED FROM PAGE 31)

judicial departments of the Government. After that come the last three Articles tersely stating the methods of amending the Constitution, assuming the debts of the Revolution, declaring the Constitution and the Laws and Treaties made under it to be the Supreme Law of the land and, finally, that the ratification of Nine States should establish it.

Follows the first signature: "G^o Washington, Presid^t. and deputy from Virginia."

Can there be the slightest question in the mind of any sane American which of these two groups to prefer to follow? There can be no other purpose in human life on this Planet than to advance in the Evolutionary Process, call it what you will—to leave this "bourne of time and place" the better for our having passed through it. How can that best be achieved—by the Communistic System of leveling down to the dregs of humanity or by the American System of lifting them all up to the best thought of the finest minds?

There can be but one answer to that question.

* * *

So it is that the boundless resources of the Land, itself, give the lie to those who preach that we must all march in lock-step and stand in bread-lines throughout our lives, because of the scarcity that has come upon us.

PLANT EXPANSION AND EQUIPMENT BUYING



... **Continental Can Co., New York, will spend about \$6,000,000 for construction of new works and additions to present plants in different parts of the country.**

o o o

... **Newport Electric Corp., Newport, Vt., will build hydroelectric generating plant and transmission lines. Cost \$150,000.**

o o o

... **Department of Public Utilities, San Francisco, plans extensions and improvements at Mills Field airport at a cost of \$1,700,000.**

o o o

... **Mid-Continent Petroleum Corp., New York, plans new natural gasoline production works near Holdenville, Okla. Cost \$100,000.**

◀ NORTH ATLANTIC ▶

Mid-Continent Petroleum Corp., 120 Broadway, New York, plans new natural gasoline production works in Olympic oil field district, near Holdenville, Okla., including storage and distribution facilities. Cost close to \$100,000 with steel tanks, compressors and other equipment. Main operating offices of company are at Tulsa, Okla.

Signal Corps Procurement District, Army Base, First Avenue and Fifty-eighth Street, Brooklyn, asks bids until May 8 for 100 power units and 15 motors (Circular 188).

F. & N. Schaefer Brewing Co., 430 Kent Avenue, has let general contract to White Construction Co., 95 Madison Avenue, New York, for three-story addition, primarily for storage and distribution. Cost about \$70,000 with equipment. Waldemar Mortensen, 103 Park Avenue, New York, is architect.

Royal Petroleum Corp., 60 East Forty-second Street, New York, has work under way on new bulk storage and distributing plant at Metropolitan Avenue and Newtown Creek, Brooklyn, to include installation of tanks and other equipment. Cost over \$60,000 with equipment. Fred W. Wilson is in charge.

Constructing Quartermaster, Military Academy, West Point, N. Y., asks bids until May 14 for water meters and depth gages.

American Brake Shoe & Foundry Co., 230 Park Avenue, New York, manufacturer of railroad equipment, etc., is considering new one-story foundry and plant on Riverside Avenue, Long Island City. Cost about \$125,000 with equipment. It is proposed to ask bids on general contract during summer. W. A. Winters is company engineer in charge.

New York Carbonic Co., 401 Broadway, New York, has leased three-story building at 355 West Broadway for new storage and distributing plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 28 for drain pumps and spare parts (Schedule 7660), crane rotating and hoisting equipment and spare parts (Schedule 7672) for Brooklyn and Philadelphia Navy yards; one electric arc welding set and spare parts (Schedule 7652); until May 1, one motor-driven grinding machine (Schedule 7694) for Brooklyn yard.

Continental Can Co., 100 East Forty-second Street, New York, has approved sale of additional shares of stock, totaling about \$10,661,000, of which about \$6,000,000 will be used for construction of new plants and additions to present plants this year. Project will include expansion at Syracuse, N. Y.; Memphis, Tenn.; Wheeling, W. Va.; Baltimore; Seattle; Chicago; Montreal, and other points. Work has been started on new multi-unit plant at New Toronto, Ont., and is scheduled for completion during summer. It will cost close to \$600,000 with equipment. Bids are being asked for additions to plant at Houston, Tex., comprising three units, 120 x 160 ft., 40 x 160 ft., and 70 x 100 ft. Cost about \$250,000 with machinery. Robert J. Cummins, Bankers' Mortgage Building, Houston, is consulting engineer for last noted expansion.

Armour & Co., Union Stock Yards, Chicago, meat packers, plan two-story addition to branch plant at 37 Spencer Street, Albany, N. Y. Cost close to \$50,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until April 27 for one tempering bath electric furnace for annealing mouth

end of cartridge cases (Circular 323), 471 gross steel wood screws, twist drills, steel nipples, gate valves, steel pipe nipples, tees, cast iron plugs, sledge hammer handles and other equipment (Circular 321).

Wanago Oil Corp., Newark, N. J., has leased one-story building at 301-19 Badger Avenue, 10,000 sq. ft. floor space, and will remodel for manufacture and blending of industrial oils and lubricants, including storage and distributing facilities.

Board of Education, 417 South Broad Street, Elizabeth, N. J., has let general contract to Fatzler Co., 11 Hill Street, Newark, for new three-story vocational school. Cost close to \$500,000 with equipment.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until April 28 for steel engine bolts, nickel-steel bolts, steel clevis bolts, steel engine nuts, steel shear nuts, castellated nuts, machine screw nuts, machine screws, alloy rivets, iron rivets, spring steel lock washers, aluminum washers and other supplies (Aero Req. 1119).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until April 27 for aluminum alloy die-castings, including 159,000 each of spacers, left and right spacers (Circular 429), 320,000 centrifugal springs and 163,200 escapement springs (Circular 428); until April 29, 489,780 naval brass forgings (Circular 422), half-hard commercial brass rod for mechanical time fuses, and similar brass shapes for like service (Circular 423).

◀ NEW ENGLAND ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 28 for one motor-generator set with control panel for Portsmouth, N. H., Navy yard (Schedule 7665); until May 5, exhaust mufflers without vent valves for Portsmouth and Mare Island yards (Schedule 7717).

Lux Clock Mfg. Co., Johnson Street, Waterbury, Conn., will soon take bids on general contract for two additions, three stories and basement, 43 x 140 ft., and one story and basement, 40 x 160 ft. Cost close to \$100,000 with equipment. Henry T. Moerkel, Naugatuck, Conn., is architect.

Newport Electric Corp., Newport, Vt., has plans for new hydroelectric generating plant. Cost over \$150,000 with penstock and other structures. New transmission line will be built. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until April 27 for twist drills, common steel wire nails, steel screws, hacksaw blades, counterbores, four high-speed cutters, 600 pipe wrenches, 19 metal slitting saws, cast iron leaders for grinding cutters and other equipment (Circular 199).

Wallace Barnes Co., Broad Street, Bristol, Conn., manufacturer of steel springs, has let general contract to George J. Lacourse, George Street, for one-story addition. Cost over \$35,000 with equipment.

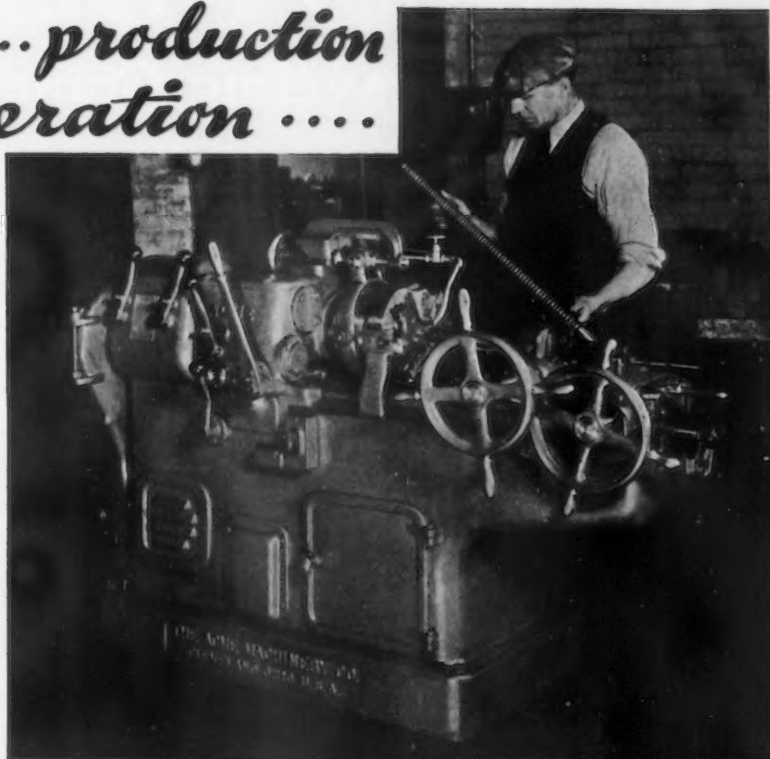
Harvard Brewing Co., Lowell, Mass., has acquired building at 340 C Street, South Boston, and will remodel for new branch storage and distributing plant.

◀ SOUTHWEST ▶

O.C.S. Mfg. Co., Coffeyville, Kan., manufacturer of oil-drilling machinery and parts, pumping equipment, etc., has let general contract to Samuel Cook, 5011 Center Street, Houston, Tex., for one-story branch plant, 65 x 100 ft., on five-acre tract in Deepwater district, Houston. New unit will be used primarily for fabricating and electric-welding service, and will be supplemented with other one-story shops later. Installation will include two 10-ton traveling cranes. Cost about \$60,000 with equipment. F. R. Coggeshall is company engineer in charge.

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until May 21 for gate shafts and

Streamlined
for appearance production
.... ease of operation



Model 35 ACME THREADING MACHINE



This new Acme offers the latest developments in design—in construction—in operating convenience. The Streamline design provides a compact, well-balanced unit with motor in base.

Gears are chrome nickel steel, accurately cut, hardened and lapped and run in oil. Shafts are also chrome nickel steel. Gears and shafts are mounted on pre-loaded anti-friction bearings. Eight speed changes are made available through a self-contained selective type gear box. Changes are made by means of levers at front of machine. Either Acme Hobbed or Tangent Die Heads can be used. The Tangent Head offers a convenient means of diameter adjustment through a hand wheel which permits changes in diameter without stopping machine. An automatic trip releases die head at completion of cut. The carriage has extra long ways, gibbed to provide take-up for wear. Ways are lubricated from reservoirs at each end carriage.

Acme Model 35 Threading Machines are built in both single and double types.

The work illustrated is typical of the wide range of threads that can be cut on this modern machine.

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equipment for Fort Peck, Mont., project, including mechanical operating equipment for eight tunnel emergency gates, 112,000 lb. bronze by-pass valves, 854,000 lb. manganese bronze liner castings, 200,000 lb. special manganese bronze liner castings, 360,000 lb. steel liner plates, 77,500 lb. vent pipes, 250,000 lb. steel reinforcement, etc.; also for tunnel power substation and electrical equipment, electrical equipment for tunnel emergency gates, and for temporary electrical distributing system (Circular 29).

City Council, Iola, Kan., will soon begin work on extensions and improvements in municipal electric power plant, to include installation of steam turbo-generating unit and accessories, boiler and auxiliary equipment. Extensions and betterments will also be made in electrical distribution system. Fund of \$224,000 has been arranged. Paulette & Wilson, Farmers' Union Building, Salina, Kan., are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 5 for one spray booth for Kansas City, Kan. (Schedule 7619).

Roegelien Provision Co., San Antonio, Tex., meat packer, has asked bids on general contract on revised plans for one-story addition, 32 x 112 ft. Cost over \$60,000 with equipment. Marvin Eickenroht, Maverick Building, is architect: L. D. Royer, Smith-Young Tower Building, is consulting engineer.

◀ WESTERN PA. DIST. ▶

Chemical Lime Co., Bellefonte, Pa., plans extensions and improvements in properties in Buffalo Run Valley district, including new large lime kiln and other structures, with equipment. Company has arranged financing for \$500,000 through RFC, considerable portion of fund to be used for purpose noted.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, plans new transmission line across section of Allegheny River, near Herrs Island.

United States Engineer Office, Huntington, W. Va., asks bids until April 27 for 1600 cast steel drain hole guards (Circular 204).

Board of Water Commissioners, 703 French Street, Erie, Pa., has let general contract to E. E. Austin & Son, 1919 Reed Street, for one-story equipment and repair shop, 80 x 150 ft., in part for storage and distribution. Cost close to \$50,000 with equipment. A. K. Hubbard, first noted address, is engineer.

◀ OHIO AND INDIANA ▶

Inland Mfg. Co., 15 Coleman Street, Dayton, Ohio, manufacturer of automotive equipment, a division of General Motors Corp., plans one-story addition. Cost over \$75,000 with equipment. Hillsmith & Co., 108 West Third Street, are architects and engineers.

Atlas Mfg. Co., Fostoria, Ohio, manufacturer of automobile equipment, affiliated with Hupp Motor Car Corp., Detroit, has taken over plant of parent organization at Fostoria for expansion.

George A. Avril Smelting Works, 2818 Spring Grove Avenue, Cincinnati, has asked bids on general contract for one-story plant unit on Este Avenue, installation to include fuel oil storage tank and equipment for operation. Cost about \$35,000. John H. Deekin, 800 Broadway, is architect.

Eaton Mfg. Co., 739 East 140th Street, Cleveland, manufacturer of automobile axles, springs, steel stampings, etc., is planning early removal of Eaton Detroit Metal Division to Massillon, Ohio, where branch plant of company is being modern-

ized. Unit totals about 70,000 sq. ft. floor space and will be given over entirely to deep drawn steel stampings for automobiles, refrigerators and allied products. Equipment installation will represent investment of over \$150,000.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until April 27 for 4900 adjustable wrenches from 4-in. to 12-in. (Circular 754), one standard signal generator and three microvolts (Circular 753); until April 28, fuel injector adapter assemblies (Circular 759), four air-cooled two-stage compressors, V-belt drive Circular 762), one motor-generator set (Circular 761); until April 29, two motor-driven tube-bending machines (Circular 766), 2000 computer assemblies (Circular 763); until April 30, one motor-generator set, starter for motor, etc. (Circular 773); until May 1, 350 ignition and manifold assemblies (Circular 745), traffic control lamp assemblies and sets of spare parts (Circular 775).

Joslyn Mfg. & Supply Co., 1701 McKinley Street, Fort Wayne, Ind., manufacturer of pole line equipment, bolts, knobs, etc., has let general contract to Indiana Engineering & Construction Co., Utility Building, for one-story addition, 82 x 145 ft., for storage and distribution. Cost over \$35,000 with equipment. Main offices of company are at 20 North Wacker Drive, Chicago.

Angell Nail & Chaplet Co., Cleveland, is enlarging plant by installing facilities for drawing of its own wire. New equipment will permit company to make nails automatically from rod to finished galvanized nail.

◀ BUFFALO DISTRICT ▶

Corning Glass Works, Corning, N. Y., has asked bids on general contract for one-story addition for assembling, storage and distribution. Cost over \$250,000 with equipment.

Cataract Brewing Co., 11-13 Cataract Street, Rochester, N. Y., is considering extensions and improvements in brewery, including additional facilities for storage and distribution. Cost close to \$40,000 with equipment.

Board of Education, City Hill, Binghamton, N. Y., plans manual training department in new three-story school on Howard Avenue, for which bids will be asked soon on general contract. Cost about \$800,000. Financing has been arranged through Federal aid. L. J. Kaley, 70 Court Street, is architect.

◀ WASHINGTON DIST. ▶

Quartermaster, Marine Corps, Washington, asks bids until April 29 for wrenches, screws, steel toggle bolts, hacksaw blades, files, rivets, drop-forged steel shackles, washers, sockets, welding rods, hoist or sling hooks and other kindred supplies (Schedule 730).

Charles T. Brandt, Inc., 1220 Ridgely Street, Baltimore, manufacturer of metal products, has asked bids on general contract for one-story addition. Cost close to \$30,000 with equipment. Charles M. Schroter, 10 West Chase Street, is architect.

United States Engineer Office, Navy Building, Washington, asks bids until April 28 for one motor-driven rotary vacuum pumping unit with accessories (Circular 71); until April 29, two motor-generator sets (Circular 72).

General Purchasing Officer, Panama Canal, Washington, asks bids until April 27 for tubular steel gates, steel grip nuts, steel nuts, steel machine bolts, steel lag screws, iron or steel expansion shields, cast iron ogee washers, iron or steel plate washers and other equipment (Schedule 3138); until May 1, 1-in. copper pipe, copper pipe unions, pressure gages, four sets flanging tools, six riveting forges, one 14,000-lb. portable hydraulic jack, two rams, stop cocks, corporation cocks, plug valves and other equipment (Schedule 3140).

Gatch Wire Goods Co., 801 Buren Street, Baltimore, has acquired four-story building at 150 West Ostend Street for expansion.

Station WDBJ, Roanoke, Va., operated by Roanoke Times and World-News, Roanoke, plans new broadcasting station, including 312-ft. steel tower, antennae sys-

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2

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tem, power station and other facilities. Cost over \$100,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 28 for steel valves (Schedule 7661), electric bus transfer equipment, magnetic switches, spare parts, etc. (Schedule 7662), mechanical revolution counters (Schedule 7635), one engine lathe (Schedule 7638); until May 1, spare parts for airplanes (Schedule 900-9484), motor-driven centrifugal clarifiers (Schedule 7615) for Eastern and Western navy yards; two motor-driven grinding machines for Philadelphia yard (Schedule 7696); until May 5, 6920 lb. forgings, 58-in. long, and nine plunger forgings for Washington yard (Schedule 7702).

◀ SOUTH CENTRAL ▶

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 1 for operating machinery for lock gates, segmental valves and outrigger for lock at Pickwick Landing, Tenn., including snatch block and sheave assemblies, hauling winches, etc.

Goodyear Tire & Rubber Co., Akron, Ohio, plans expansion at branch plant at Gadsden, Ala., primarily for tire manufacture. Cost over \$60,000 with machinery.

United States Engineer Office, Mobile, Ala., asks bids until April 27 for one cast steel pump shell (Circular 245).

Cudahy Packing Co., 221 North LaSalle Street, Chicago, meat packer, is considering new branch plant at Selma, Ala. Cost over \$75,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until May 11 for 5700 lb. common wire nails and 26 rolls bronze screen wire (Circular 243).

Lloyd S. Jones, Simplicity System Building, Chattanooga, Tenn., is at head of project to establish a local plant for production of boilers, tanks and other plate products. A new company will be organized to carry out enterprise.

◀ SOUTH ATLANTIC ▶

Board of City Commissioners, DeLand, Fla., has authorized financing in amount of \$468,000 for new municipal electric power plant and distributing system and plans to begin work soon. Of amount noted, fund of \$117,000 has been secured through Federal aid.

City Council, Atlanta, Ga., asks bids until April 28 for new municipal sewage disposal plant on South River, including boiler station, pumping plant, switchboard room, tanks, digesters, clarifiers, sludge equipment, etc. Robert & Co., Inc., Bona Allen Building, is engineer.

State Board of Regents, Atlanta, Ga., has rejected bids recently received for new vocational school at State Teachers' College, Forsyth, Ga., and will ask new bids early in May. R. H. Driftmier, Athens, Ga., is consulting engineer. Dr. S. V. Sanford is head of board.

◀ MIDDLE WEST ▶

Champion Pneumatic Machinery Co., 8164 South Chicago Avenue, Chicago, manufacturer of machinery and parts, has let general contract to Smedberg-Nordell Co., 7937 Indiana Avenue, for one-story addition, 51 x 107 ft. Cost over \$35,000 with equipment. Robert S. Smith, 111 West Monroe Street, is architect.

Burd Piston Ring Sales Co., 2401 Tenth Street, Rockford, Ill., has let general contract to Security Building Co., 717 East Jefferson Street, for one-story addition, 32 x 98 ft.

Mills Novelty Co., 4110 West Fullerton Avenue, Chicago, manufacturer of coin-operated machines and parts, has leased one-story building on Palmer Street, totaling about 78,000 sq. ft. floor space, for new plant for large increase in present capacity.

State Board of Administration, State Capitol, Bismarck, N. D., asks bids until April 30 for power house equipment for plant at institution at San Haven, N. D., including boiler units and accessories. Fund of \$135,000 has been arranged for this and other construction. William F.

Kurke, 1117 Thirteenth Avenue, North, Fargo, N. D., is architect.

Scott Rural Electric Co-Operative Association, Davenport, Iowa, Harry Strong, supervisor, in charge, will soon take bids for new transmission and distributing lines for rural electrification, with power substation and service facilities. Fund of \$260,000 has been secured through Federal aid.

Brandtjen & Kluge, Inc., Blair and Gaultier Streets, St. Paul, Minn., manufacturer of automatic printing presses and parts, feeders, etc., will soon take bids on general contract for two-story and basement addition, 63 x 170 ft. Cost close to \$75,000 with equipment. Allan C. Fleischbein, Endicott Building, is architect.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until April 28 for 6800 jacks (Circular 54).

Tousey Varnish Co., 520 West Twenty-fifth Street, Chicago, has let general contract to Otto Randolph, Inc., 53 West Jackson Boulevard, for two-story plant unit, 59 x 125 ft. Cost over \$65,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Hodge Tool & Mfg. Co., Grand Rapids, Mich., has asked bids on general contract for one-story addition, 90 x 100 ft. Cost close to \$35,000 with equipment. Don Lakie, Grand Rapids, is architect.

All-Metal Products Co., Wyandotte, Mich., manufacturer of metal goods, has awarded general contract to Barton Marlow Co., 1900 East Jefferson Street, Detroit, for one-story addition. Cost about \$30,000 with equipment.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, plans modernization and improvements in branch plant at Dayton, Ohio, formerly used for production of Maxwell automobiles and closed for past five years. New equipment will be installed in different departments.

Standard Products Co., 1011 Power Avenue, Cleveland, manufacturer of automobile equipment, has acquired Buhl airport property, near St. Clair, Mich., comprising about 400 acres, with one-story hangar, 90 x 150 ft. Latter structure will be converted into a plant for production of company specialties. Other units will be built later. Cost over \$50,000 with equipment.

Koppitz-Melchers, Inc., 2169 East Atwater Street, Detroit, brewer, has plans for two-story and basement addition, 75 x 120 ft., primarily for a mechanical bottling works. Cost over \$75,000 with equipment. Mildner & Eisen, Hammond Building, are architects and engineers.

Detroit Vapor Stove Co., 12345 Kercheval Avenue, Detroit, manufacturer of stoves and parts, has let general contract to O. W. Burke Co., Fisher Building, for one-story addition for general shop, storage and distribution. Cost over \$40,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

◀ PACIFIC COAST ▶

Three G Distillery, 3112 West San Fernando Road, Burbank, Cal., has plans for three one-story additions, for general production, storage and distribution. Cost over \$200,000 with machinery. Arlos R. Sedgley, 910 North Serrano Avenue, Los Angeles, is architect.

Department of Public Utilities, City Hall, Civic Center, San Francisco, E. G. Cahill, manager, plans expansion and improvements at Mills Field airport, South San Francisco, to include new reconditioning and repair shops, hangars and other buildings. Cost \$1,700,000 with equipment. Financing is being arranged through Federal aid.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 28 for 30,000 ft. steel wire rope for Mare Island navy yard (Schedule 7639), four torsion meters for aircraft main propeller shafts and spare parts, for Mare Island and Puget Sound yards (Schedule 7655), one motor-driven hacksaw machine for San Pedro, Cal., yard (Schedule 7654); until May 5, one motor-driven horizontal wood-boring machine for Puget Sound yard (Schedule 7676).